VOL. 4, NO. 10. OCTOBER, 1906.

# THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD. THE BRASS FOUNDER AND FINISHER AND ELECTRO-PLATERS REVIEW.

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A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

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METALLOGRAPHY · BRASS · METALLURGY

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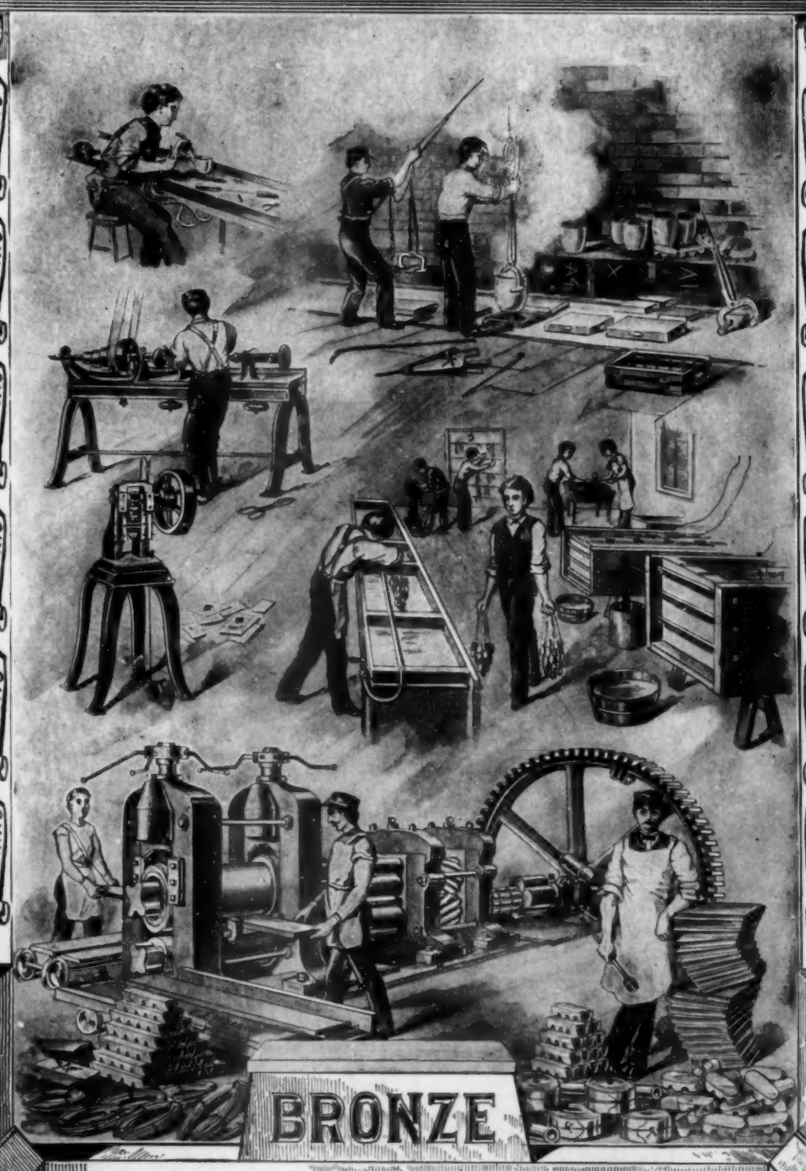

OLD SERIES FOUNDED OCT., 1894 FOUNDED JAN., 1903 NEW SERIES

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Contents, Page 236 Want Ads. Page 258 Directories Page 17 Index to Advertisers, Page 23

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### THE BRASS FOUNDRY AS IT SHOULD NOT BE.

Most brass foundrymen, no matter how small and insignificant the plant they have, hope some day to be able to re-equip and bring it up to date. They are very patient because the hope within them is very strong. The most progressive are alive to the advances and improvements made by their neighbors and take mental note of the changes for possible reference in the future. While the question of money bars most of these men from making immediate improvements, there are certain alterations that could be made with profit to themselves and benefit to their workmen.

In the majority of cases, where the brass foundry is conducted simply as an adjunct, or convenient branch, of a manufacturing concern, it is the dirtiest and most unhealthy department in the entire establishment. Again, in most instances this condition is not caused by want of knowledge on the part of the foreman, but by indifference on the part of the management. Accurate results are expected, but no one in authority appears to take any interest in the methods and appliances by means of which these results are accomplished. The head of the house will discourse wisely, perhaps, upon the percentages to produce an alloy of certain quality, but will not enter the brass foundry because he will get his shoes dusty, or because the fumes make him cough.

Two or three inexpensive changes could be made, if the one with the necessary power would only look and then think a little. In foundries such as we have in mind no attention whatever is paid to the fuel account; the furnace is arranged to consume fuel and it does its work to perfection. How much of the heat escapes without doing useful work, and how much passes into the crucible are questions which seem of interest to no one. The metal is melted, and that is the all important consideration; but no one knows how much it costs in fuel to melt a single pound.

The fumes arising from a pot of melted brass are not healthy, nor do they resemble the odors wafted from the spices of the Indies. Sometimes, not often, an attempt is made to conduct them away, but generally they are allowed to wander whithersoever they will. Financial and humanitarian reasons would seem to demand their efficient removal.

But the most serious fault is yet to come. The ordinary brass foundry bears a strong resemblance to a scrap pile. We can find only one explanation for this.

A very large percentage of the metal used comes in the form of scrap, and it must be that the scrap influence pervades the foundry. The pure metals are handled with some semblance of care, but the contamination of the scrap is in the ascendancy.

All of these things, and they are the most essential, could be remedied without an expenditure of much money; and they certainly would be if the management could be convinced that the outlay would pay interest in large figures.

Those who are interested in either up-to-date or antique foundries would do well to read carefully the article presented elsewhere in this issue on the new foundry of the General Electric Company, at Schenectady. The refinements there described were not introduced because the company had unlimited financial ability and wished to present a sort of edition de luxe in foundry practice. Every item was thoughtfully considered and its earning power calculated. The productive capacity was the most essential question and every appliance and arrangement that tended to increase this was provided. As said before, the small foundry cannot afford all these, but it can get valuable hints, the carrying out of which will not strain its bank account.

## THE BRASS ASSOCIATION.

The first gun has been fired for the organization of the American Brass Founders' Association in the shape of a circular letter entitled "Committee on Organization of an Association of Brass Founders and Allied Interests" and signed by Chas. J. Caley, chairman, and Richard Moldenke, secretary. Last July THE METAL INDUSTRY mentioned that the preliminary steps toward the formation of such an organization had been taken at the Cleveland meeting of the American Foundrymen's Association and that Mr. Caley had been appointed chairman and Dr. Moldenke, secretary. Dr. Moldenke's many years' experience as the secretary of the Foundrymen's Association peculiarly fits him for the work of forming a new society and Mr. Caley's business position as general superintendent of the Russell & Erwin Manufacturing Company, New Britain, Conn., and his knowledge of the brass business render him a valuable man for the proposed association.

In the circular letter which has just been issued the committee state that the remarkable advance in recent years in iron foundry practice is mainly due to the work of the Foundrymen's Association, who saw the advantages to be gained by co-operation in business and metallurgical problems. Believing that the benefits that have been secured by the iron foundry can be extended to the other foundry interests in brass, bronze, aluminum and other metals, the committee asks all founders in the non-ferrous metals to become members in the new Foundrymen's Association. The society is to be affiliated with the American Foundrymen's Association, yet to be an independent organization. It is to meet with the older association at its conventions. The two societies are to be entertained jointly by the local bodies and to take part in the exhibits. Its transactions are to be published with those of the iron founders' association. This makes it desirable for the brass people as it gives them the advantage of the experience of an older and kindred organization.

The next meeting of the American Foundrymen's Association will be held in Philadelphia, Pa., in May, 1907, and preparations have been made to entertain over 1,000 guests. Exhibits of working machinery are already being gathered and it promises to be of sufficient interest to attract every foundryman in the country. The committee therefore calls on the brass interests to come forward and show their iron brethren that they are possessed with the same spirit of progress and are determined by co-operation to improve the existing trade conditions in every way possible.

Applications for membership in the society should be addressed to Dr. Richard Moldenke, secretary of the American Foundrymen's Association, Watchung, N. J.

## ORDERING SHEET BRASS.

As the ordering of sheet brass is liable to cause some misunderstanding between the consumer and the manufacturer, unless care is taken, a few general rules which will aid the consumer in getting the material he desires and therefore avoiding delays and insure prompt shipment will be of interest. We therefore cite the following rules which are based on the practical experience of the manufacturer:

First. The consumer should state the kind of metal required. Whether high or low brass or bronze. In the absence of specifications in this direction ordinary high brass will be supplied.

Second. The consumer should state the temper, whether dead soft, soft, half hard, spring or extra quality spring. When no temper is mentioned, ordinary soft or annealed brass is furnished. It would be well in this connection to always mention the kind of work for which the metal is to be used that the mill may be in a position to make use of their superior metallurgical knowledge in supplying the quality best adapted for the class of work.

Third. The consumer should state the quantity required. The number of pounds if in rolls, or the number of sheets if required in flat sheets.

Fourth. The dimensions, width or thickness if in rolls, or with length and thickness if required in flat sheets, should always be given.

Regarding the gauge for measuring brass, it may be said that Brown & Sharpe's gauge is the standard, and if no other gauge is mentioned, Brown & Sharpe's is understood to be what is required.

In these days of accurate measurements the micrometer caliper has become the standard, for with the micrometer there would be no mistake in the gauging. They are adjustable to wear and when one becomes accustomed to measuring with them they would not care for the old type of round style gauges. Special micrometers are now made for measuring sheet, tubing and wire.

Manufacturers of sheets much prefer to have the thickness given in thousandths of an inch, rather than in gauge numbers. The micrometer measurement is much the more accurate method and there is less danger of error.

## OUR PROFESSIONAL DIRECTORY.

One word for our Professional and Expert Directory which contains the names of 16 individuals and firms who are either Chemists, Metallurgical or Mechanical Engineers, Patent Attorneys or Expert Metal Workers and Platers. Any of our readers needing analyses of metals, metallurgical advice of analyses, the services of a Patent Attorney or Expert Metal Worker or Plater can obtain this service from the list of names published on another page. The individuals composing this Directory are residents in various parts of the country, so they are quickly available for all sections and their professional and practical standing is all that is desired.

# THE MODERN BRASS FOUNDRY OF THE GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

By F. M. Feiker.

As an example of successful planning to secure the most economical as well as the most hygienic operating conditions, the new brass foundry at the Schenectady Works of the General Electric Company may well be taken as a model. Not only have the methods of handling and finishing raw material been carefully systematized, but the operating conditions have been greatly improved so that the establishment is very free from the disagreeable fumes and dust generally associated with brass founding. Healthful working conditions as well as improved machinery are combined to bring about the most efficient production.

EXTERIOR VIEW OF FOUNDRY.

GENERAL VIEW OF MOLDING ROOM.

The main structure is a two story building of brick and steel somewhat separated from the surrounding

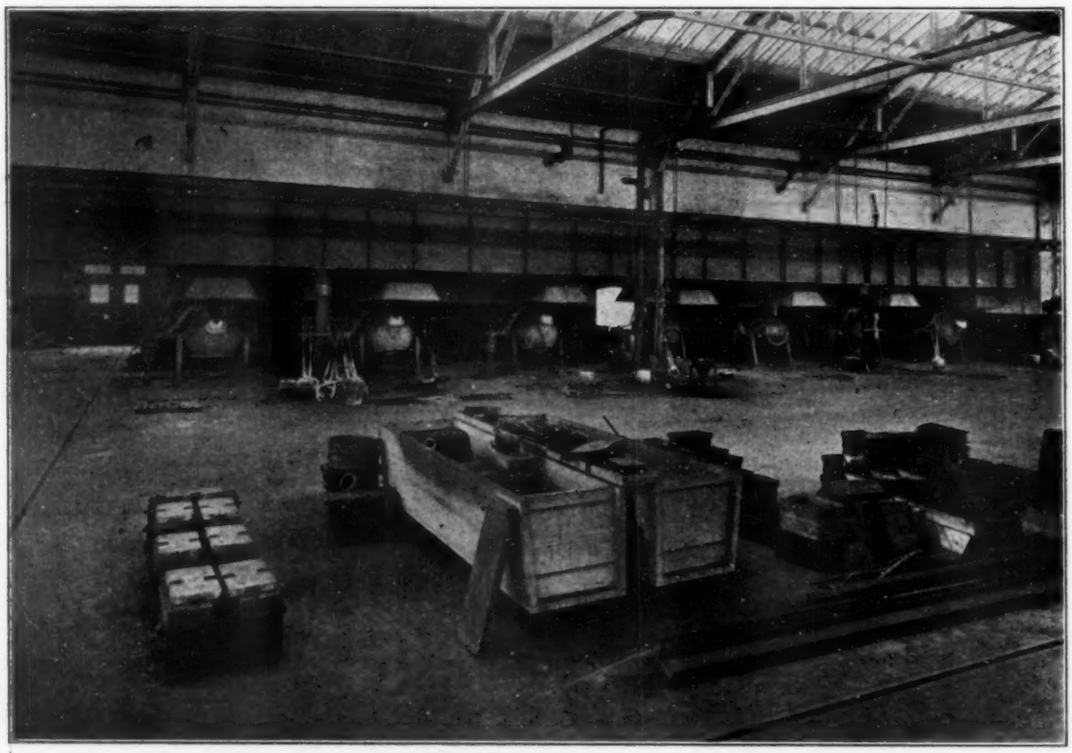
factories, 260 feet long and 90 feet wide. The building is divided into two main sections; one comprising a moulding room extending the entire length of the building, while the other part of the building is subdivided into two stories. On the lower floor of the two story section are the furnaces, core ovens, core rooms, weighing rooms, storage bins and toilet rooms; the upper floor contains a moulding room for delicate parts with storage and boiler rooms. The weighing room is directly behind the furnaces. Here each charge is weighed and delivered to the furnacemen, avoiding mistakes which would be likely to occur when so many different metals are required. A large freight elevator serves the two story portion of the foundry in addition to stairways at the front and back. The moulding room and lower floors are laid in cement, the moulding room having low dividing walls separating the various classes of moulding so that each is isolated, while at the same time advantage is taken of the better light and ventilation resulting by keeping the room free from high partitions. Excellent light and ventilation are further assured by ventilating sashes running the entire length of the roof.

In addition to the main foundry but isolated from it are two other structures; one for storing the crude petroleum, used as fuel, the other fitted for cleaning the completed castings. This isolation of all cleaning processes from the main foundry building eliminates all dust which would escape into the air no matter how careful a system of exhaust air piping was installed.

It is evident from an inspection of the building that the General Electric Company believes in the adaptability of the electric motor for machine drives quite as strongly as it urges the use of this model power for general use in factories. The inherent convenience and cleanliness of the electric motor for driving blowers, exhaust fans, oil pumps, compressors, and other machinery are well exemplified in the new foundry. The various applications of motors to different machines are shown in the illustrations.

As the method of ventilating in the foundry is unique and involves the transfer of very hot gases through the piping and fans, all bearings which are subjected to the high temperatures are watercooled in order that the babbitt linings may remain uninjured. In several instances the use of electricity as a motive power alone makes possible the fulfillment of the general scheme for efficiency and safety in operating conditions. The electric motor driven oil pumps in a well outside the oil storage reservoir are examples in point. Not only is the fire risk eliminated but the installation would have been well nigh impracticable had any other form of prime mover been employed.

Next to the advantageous adoption of the electric drive to facilitate economy in production, the new foundry has many distinctive features in regard to handling of raw materials and product. The sand which goes to the foundry is brought directly to the building in cars and unloaded by a portable sand conveyor through trap doors over the bins. As far as possible man-handling is done away with and the process of unloading simplified to the limit. Within the building the transportation problem has been carefully worked out. A complete trolley track system has been installed so that the molten metal from the furnaces can be carried directly to the aisles of flasks without loss of time. As the ladles by this method are carried free from the floor, the liability of accident to either moulds or workmen is reduced to a minimum and the pouring off can be accomplished in the quickest possible time. About 20 tons of metal are poured in a day.



A ROW OF SCHWARTZ FURNACES.

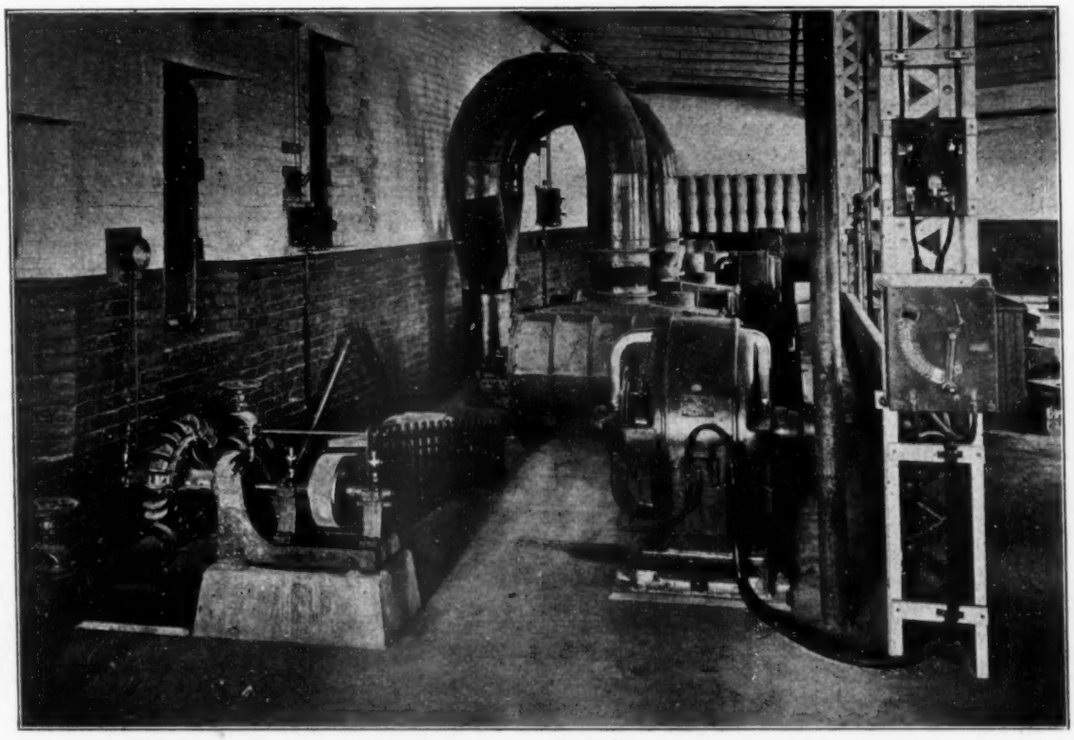
Probably the most interesting point in the foundry is the method employed for utilizing the hot gases which pour continually from the noses of the Schwartz furnaces. Ordinarily these gases are not only wasted but penetrate the whole foundry, making it a disagreeable place in which to work. At the foundry of the General Electric Company this problem has not only been solved satisfactorily from the standpoint of operating conditions, but the gases ordinarily wasted are turned into an exhaust system and used to heat the core ovens and also the building during cold weather.

Over the row of brass furnaces are placed wide mouthed ventilating hoods which exhaust the hot air and gases completely from beneath them. The ventilation is obtained by an electrically driven power exhaust fan located in the second story of the building and it is so perfect that the intense heat of the furnace is not felt uncomfortably by a person standing beside it. The furnace man can thus work to best advantage and watch more carefully the melting brass. The hot gases are piped to the core ovens in one case, and, a more unusual adaptation, are lead to a 200 horse power steam boiler located on the floor directly over the furnaces; the water in this boiler is used in winter to heat the buildings. An auxiliary oil burning grate is fitted to the boiler so that the building may be kept warm during the holidays and week ends when the brass furnaces below are not in operation. Ordinarily, however, this means of heating the boiler is not used.

In addition to the Schwartz type of furnace a row of crucible furnaces is installed for melting special mixtures. The heat from these furnaces is used to heat the core ovens in conjunction with the exhaust system of the converter type of furnace. The crucible furnaces are coal fired, but the Schwartz smelters use crude oil pumped from the reservoirs outside the main foundry as has been described.

A description of the equipment of the moulding room would not be complete without mention of the moulding machines. Thousands of duplicate brass parts are used in the manufacture of electrical machinery and these parts are moulded much more rapidly by machines than by hand. Some difficulty has been experienced, hitherto, in obtaining a suitable foundation for the moulding machines. The recurring impact of the ramming plates weakens the foundations and throws the machines out of line. This difficulty has been surmounted in the foundry of the General Electric Company by making the foundations elastic. The compressed air used in operating the moulding machines is supplied from a motor driven compressor.

As has been mentioned the work of cleaning the castings is carried on in a separate building. Modern methods are employed in this part of the work and the sand blast is used in cleaning. Not only is this a much quicker method of cleaning castings but the saving is made even more evident in the machine shop as the sand and grit have been removed from the parts and the machine work is made so much the easier for the cutting tool. The rumblers for cleaning the small pieces are electrically driven and an exhaust ventilating system is employed to eliminate the dust as far as possible.



MOTOR DRIVEN EXHAUST PUMPS.

It has been stated that this foundry was planned with an eye to hygienic conditions as well as economical manufacturing considerations. Besides the general features for the comfort of the workmen which have been mentioned very complete arrangements are made for washing. In addition to the usual facilities, shower baths with hot and cold water are provided, the water being heated by the waste gases from the furnaces. Special precautions are taken in these rooms to provide the best sanitary conditions and the construction so far as possible is of metal and slate.

## SYSTEM IN FINDING COSTS OF BUFFING, PLATING, DIPPING AND LACQUERING WORK.

By D. C. Eggleston, M.E.

I would call the attention of readers of The Metal Industry to the best methods of finding the cost of buffing, plating, dipping and lacquering work. If the departments mentioned are in a large works it is customary to treat all but the buffing as special departments in distributing expense. The nature of the work in the buffing department is not so different from that in the other manufacturing departments as to require special investigation, so that the usual methods followed need not be departed from in the case of this department.

No matter what system is used in assessing expense against jobs the first step is to find the expense chargeable against the various departments mentioned. This involves the classification and distribution of expense items. That the exhibit of shop expense may be an aid to practicing economies in the shop management it is customary to show the charges to the various departments in detail. Thus the charges for power, light, heat, rent, tools, supplies and sundry expenses are shown as minutely subdivided as possible. It is best to make the figures for the various items of expense for one period comparative with those for a previous period, that any increase or decrease may be investigated.

The system most generally used for assessing buffing department expense against jobs is the percentage on labor plan. The ratio which the buffing department expense is of productive labor can easily be found and to the amount of productive labor on a job the proper percentage can be added to give the indirect expense charge for power, rent, tools, supplies and so on. This method of procedure gives good results especially as the work of the buffing department is usually homogenous in nature.

However, many cost system experts advocate the machine hour plan as conductive to the most accurate costs of production. This method requires a more elaborate system in distributing expense than the percentage on labor plan. Yet since it is oftentimes desirable to handle the work of the buffing department in connection with that of other departments where the machine hour system is used I will explain it.

A division between expense items incurred in connection with material and those with machines is necessary. The material expense which includes the cost of inspecting, handling and storing material both raw and in process of manufacture is prorated against jobs on the basis of the raw material used. The machine expense divided by the number of normal buffing machine hours gives the rate per machine hour. Letters indicative of the hourly rate can be affixed to the machines and written on the operators' time tickets. Then the machine expense is extended simultaneously with the operators' time. Thus in this system part of the buffing department expense is assessed against jobs on a percentage plan and part by the machine hour method.

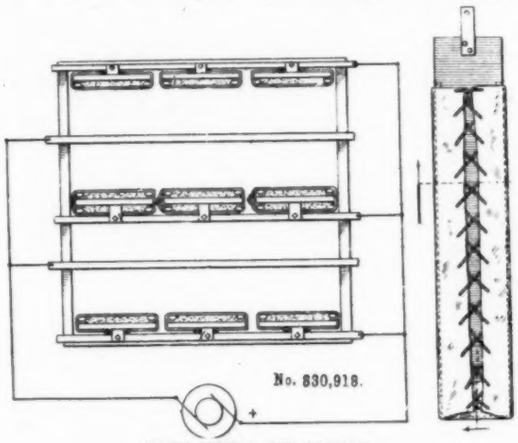
The expense of the plating, dipping and lacquering departments is best disposed of as a rate per man-hour. The expense of each department divided by the number of man-hours normally worked gives the rate. However, if the work of any department is put on a piece work basis it is impracticable to apply expense as a rate per man-hour. It is then necessary to use the percentage on labor plan which was previously mentioned unless data can be accumulated to apply loading on the basis of weight of output. It is customary to revise the rates monthly as any over or under activity of the shop results in an increase or decrease in the rates. If the rates per man hour in the plating, dipping and lacquering departments are less than $0.30, $0.35 and $0.18 respectively, and the machine hour rates for buffing work are less than $0.25 the shop is being run economically. That the methods herein described have been evolved to meet the requirements of a large works suggests that they are worthy of careful consideration.

### HOW TO FIGURE COSTS IN THE BRASS BUSINESS.

A pamphlet that will prove of great value to every manufacturer of brass goods has been prepared by the National Association of Brass Manufacturers and a copy can be obtained from Wm. M. Webster, Commissioner, 1110-1112 Schiller Building, Chicago, Ill. In formulating this cost system the committee took into consideration the fact that a more intricate plan than it submitted could be adopted and a more detailed result arrived at. This would have been unwise because each manufacturer now has certain methods of his own and to compel him to make radical changes would entail too much extra expense. The foundry costs are arrived at by simply inventorying everything on hand on the first day of each month, recording everything purchased during the month, and keeping an account of all wages paid, and castings produced. The pamphlet presents blanks and explains very thoroughly how this can be done in a simple and plain way. These results were obtained by the combined opinions and experiences of a number of manufacturers who have not only given this matter careful study but who have made a success of their own business.

### NEW FORM OF ANODE.

Letters patent granted to John Nelson, of Peru, Ind., describe a new form of anode used in electroplating. It belongs to that class which is adapted to support the material to be used for plating purposes in granular, lump or scrap form, so disposed as to expose to action the maximum surface possible of the metal which is to enter into the electrolyte. The anodes consist of a conducting bar, preferably made of graphite, having vertical strips along the edges and the whole being enclosed in a porous envelope of fibrous material to permit the free circulation of the electrolyte. In the bag thus formed the lump nickel or other material is placed. This construction provides for free circulation of the electrolyte and contact with the metal at an unlimited number of surfaces of the particles, and also an even distribution of the material with reference to the plate, and the ready maintaining of that condition.




NEW FORM OF ANODE.

## SOME FEATURES IN THE METALLURGY OF COPPER.*

By Thomas Johnson, Jr.

The paper states that the amount of copper used for electrical purposes is probably greater than for any other purpose, more even than for alloying. But before copper assumes commercial form it has undergone many changes since it first saw the light of day. After being smelted and refined it is cast in various shapes and forms according to requirements. Now in this cast condition copper does not possess that strength and homogeneity to anything like the same degree that it subsequently attains when mechanical work has been expended upon it.

The accompanying series of micro-photographs clearly illustrates the effect of mechanical treatment on copper.

*Plate No.* 1.—This shows the microstructure of "cast" copper, which, it will be observed, is of a coarsely crystalline character. On being mechanically tested this "cast" copper gave a tensile strength of 10 tons per square inch and an elongation of 24 per cent. The result of this mechanical testing is, of course, very low, but is far superior to what could be produced by casting in sand moulds, as in the latter case the castings are always more or less porous. This particular copper has been cast under pressure into an iron mould, and it is a well-known fact amongst metallurgists that metals cast under pressure are invariably more homogeneous and of closer grain than when no pressure is applied.

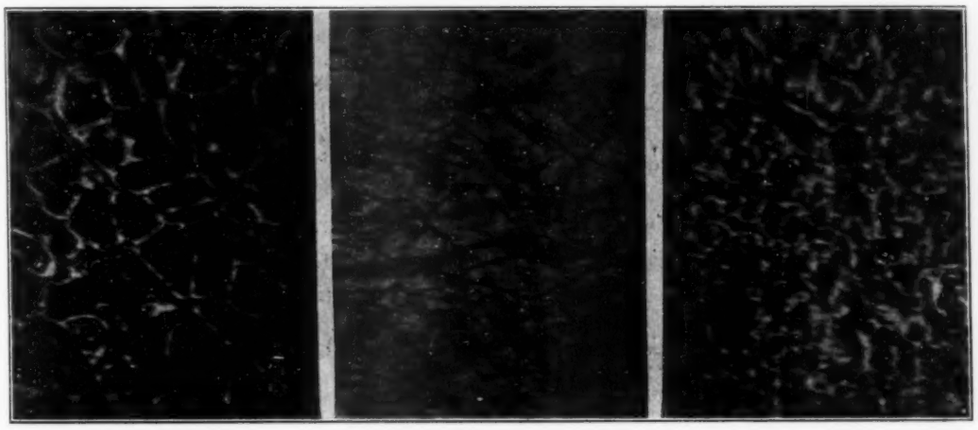


FIG. 1. Cast copper. Tough quality. Arsenic 0.50 per cent.

FIG. 2. Tough copper, after hot forging.

FIG. 3. Tough copper after rolling.

*Plate No.* 2.—This is exactly the same material, which has been subjected to mechanical treatment by being forged while hot. Here the change which has taken place in the structure will be readily noticed. The crystals are much smaller, and the whole mass appears to possess greater homogeneity. The tensile strength of this sample was 12.75 tons per square inch, and the elongation 38 per cent.

*Plate No.* 3 shows the microstructure of the same copper, which has been further subjected to mechanical treatment, by being "rolled." The crystals here are shown to be smaller, and the tensile strength of this sample was 14 tons per square inch and the elongation 48 per cent.

*Plate No.* 4.—Here, again, we see the microstructure of the same copper which has undergone still further mechanical work. This, in fact, is from a sample of highly wrought cold-drawn copper, and it will be noticed that the difference between this and the first microphotograph of the series is remarkable.

The tensile strength has increased from 10 tons per square inch to 15.9 tons per square inch, and the elongation from 24 per cent. to 50 per cent. The specific gravity is 8.896 as compared with 8.83 of the first sample.

In all the foregoing specimens the arsenic content was 0.5 per cent., and this arsenic is shown as a compound of arsenic and copper surrounding crystals of copper, but my sole object in this case has been to show the effect of mechanical treatment upon the structure of the copper, from the time that it was in its "cast" and unworked condition, to when it was ready to be taken over by the engineer for whatever purpose he required it.

The author then alluded to two microphotographs, loaned by W. E. Storey, of Manchester, which were taken from copper tubes, which, unlike the foregoing specimens, have been electrolytically deposited. The deposited shells have been drawn down to ½ in. outside diameter No. 16 W. G., and to ¼ in. outside diameter No. 1-16 in. thick.

Now, after having studied the effect of mechanical treatment upon the structure of copper, one would expect to see similar results here. The author was unable to say what the original thickness of these electrolytically deposited tubes was, but they must have been subjected to considerable mechanical work to reduce them to the sizes which have been mentioned. In both cases, especially in the first one (*a*), the structure is shown to be of a coarsely crystalline character, altogether different from the ones exhibited previously, or rather more like the first of the series (unworked). The electrolytically deposited tubes do not appear to be suitable for purposes where very high pressures have to be withstood, or where any high degree of temperature has to be attained. Electrolytically deposited tubes become annealed at the comparatively low temperature of ordinary steam pressure. They neither possess the strength or homogeneity of an arsenical tube produced in the ordinary way.

In regard to the so-called tempering of copper the author said that in steel we have a much cheaper and more abundant metal; moreover, copper has its special uses, which at present cannot be replaced, and as these absorb the supply of metal, nothing would be gained by any process which would enable us to substitute it for a cheaper metal.

Passing from this so-called "tempering," mention was

*Abstract of paper read before the Birmingham Metallurgical Society, England.

made that frequent attempts have been made to "weld" copper, but reference to this subject is deferred to the latter portion of the paper.

### THE EFFECT OF VARIOUS IMPURITIES ON COPPER.

To deal adequately with this subject would necessitate a paper dealing exclusively with it, and would require a vast amount of time and research; the author therefore pointed out that his remarks would necessarily be scanty. As the various classes of copper which are made are used for entirely dissimilar purposes, and as the presence of an impurity which would be fatal in one case and yet have no deleterious effect in another, it is advisable to briefly note the effects of these various impurities upon—

1st, Copper—used for electrical purposes.

2nd, Copper—(best selected) used for alloying purposes.

3rd, Copper—known as tough quality.

With regard to the first of these three sections, the electrical engineer insists that his copper shall offer the minimum amount of resistance to an electrical current, and this necessitates the copper being practically pure, and at the present time this degree of purity is effected by the electrolytic deposition of copper. In the electro-deposited condition, however, the copper is unsuitable to be drawn into wire, etc., owing to its heterogeneous nature, and therefore requires melting and subsequently casting into bars, which in turn have their shape transformed into wire. The electrician demands that his copper shall possess an electrical conductivity of not less than 100 per cent.; and, as a matter of fact, this figure is often exceeded, the figure 101 being more frequently arrived at than 100. This may appear strange, but still that is how matters stand. Personally, the author thought the standard required altering. The very best electrical conductor obtainable is pure silver. This, of course, gives a conductivity of 100 per cent. Copper, compared with silver, comes next with a conductivity of about 94 per cent. Why should not this be the accepted standard?

The natural assumption is that when the standard for copper was originally made, the purest copper obtainable was taken as 100 per cent., but since then the improved methods of producing electrolytic copper have enabled a purer material to be produced than formerly, hence the conductivity is greater than when it was put down at 100 per cent.

If pure copper were taken as 100 per cent. silver would be about 106 per cent., so it will be seen that the standard used for copper ignores that of its richer rival.

The following table will clearly show that the presence of another element, even in very small amounts, decreases the electrical conductivity of copper considerably.

Table showing the effects of small amounts of impurities in pure copper:

| | Pure copper. | | | Conductivity 101 Per cent. |
|---|---|---|---|---|
| 1. | Copper containing | .06 | Lead | 100.6 |
| 2. | " " | .05 | Tin | 100.5 |
| 3. | " " | .05 | Silver | 99.8 |
| 4. | " " | .10 | Oxygen | 99.8 |
| 5. | " " | .05 | Gold | 99.7 |
| 6. | " " | .004 | Silicon | 99.7 |
| 7. | " " | .01 | Aluminium | 99.7 |
| 8. | " " | .02 | Manganese | 98.8 |
| 9. | " " | .02 | Aluminium | 98.8 |
| 10. | " " | .09 | Iron | 98.8 |
| 11. | " " | .01 | Sulphur | 98.5 |
| 12. | " " | .02 | Zinc | 98.5 |
| 13. | " " | .004 | Phosphorus | 98.5 |
| 14. | " " | .01 | Silicon | 98.4 |
| 15. | " " | .05 | Antimony | 96.9 |
| 16. | " " | .01 | Bismuth | 95.7 |
| 17. | " " | .02 | Platinum | 93.6 |
| 18. | " " | .04 | Arsenic | 92.4 |
| 19. | " " | .05 | Cobalt | 92.0 |
| 20. | " " | .05 | Nickel | 91.4 |
| 21. | " " | .06 | Arsenic | 82.0 |

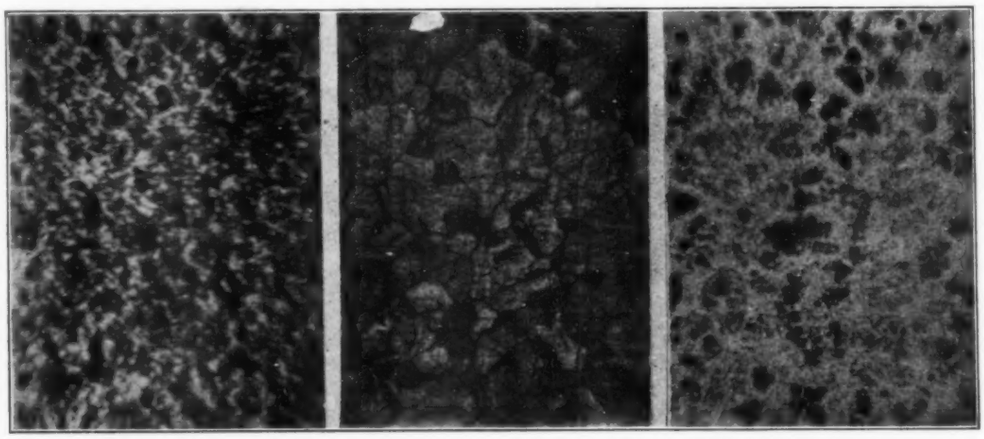


FIG. 4. Tough copper after drawing into finished tube.

FIG. 5. Extremely pure electrolytic copper.

FIG. 6. Copper containing 1.80 per cent oxygen, or 16.02 per cent cuprous oxide.

It will be observed in the foregoing table that lead and tin (both of which possess a very low conductivity) do not decrease the conductivity of copper, so much as silver which possesses, as stated before, a higher conductivity than copper itself, silicon, aluminium, manganese and phosphorus (often used as de-oxidizers), considerably reduce the conducting power of copper when present therein. Perhaps the most remarkable effect shown in this table is where the presence of 0.06 per cent. arsenic reduces the conductivity of copper as much as 19 per cent.

In my opinion best selected copper should assay not less than 99.70 per cent. Antimony and arsenic should, be or at all events present only in traces. Small quantities of bismuth, iron, nickel, cobalt, tin, silver and oxygen are often present, but do absent, materially affect the copper used for alloying purposes.

(To be Continued.)

### ALUMINUM IN INDIA.

The world's production of aluminum is in the hands of five companies—one in America, one in Great Britain, and three on the Continent—and these companies have formed a ring to control the price of the metal, and to limit the output to the needs of the market. Notwithstanding its many very special qualities, aluminum for various reasons has not made such rapid progress as was anticipated ten years ago, when the cost was reduced to a level which enabled it to compete on fairly even terms with brass and copper. No very accurate figures are available regarding the quantity of aluminum manufactured, but it is probable that it is still under 15,000 tons per annum. To some extent aluminum has taken the place of copper, and in America it is very largely used for the cables of electric power transmission plants, and the prices at which aluminum is sold fluctuate with the prices prevailing for copper. At the present time sheet copper is about £84 a ton, which is an extremely high price, and in sympathy with its rapid advance the aluminum-producing companies have raised the price of aluminum to about the level of that in 1897. For seven years the price was steadily decreasing, and now, almost suddenly, it has gone back to the old price, and there is no likelihood of any reduction, unless there be a slump in the copper market, or a new producing company enters the field endowed with sufficient capital to withstand the opposition of the existing associated companies, who would undoubtedly lower their prices in the hope of rendering it impracticable for any new production works to be started.

The primary object with which we started manufacturing aluminum wares in Madras some eight years ago was in the hope that we could create in India a sufficiently large market to render it practicable to establish aluminum-producing works in the country itself. But, so far, the results achieved go but a very little way toward attaining the desired end. At the present time India absorbs less than 100 tons of aluminum a year, and it is improbable that any producing works could be started with any chance of success unless they could rely upon a market for at least ten times that quantity. That India can very well absorb a thousand tons of aluminum a year there is not the slightest doubt, as that would simply mean the displacement of about 10 per cent of the brass and copper which are now imported into the country. Aluminum has done so well in India that it is difficult to say why it has not done very much better. In the Godavery District it is very largely used by natives, and there are several firms who purchase sheet metal in Madras and manufacture it into vessels locally. Nearly 30,000 lbs. of metal has been sold in the unmanufactured state during the last six months, and the bulk of this has gone to this one district. What has happened in one district might occur in many others, and an investigation of the causes which have rendered aluminum so popular in the Dodavery District would probably lead to results of considerable importance, and show the way to bring about a very great increase in the demand for raw metal. The Indian Army, both European and native, are undoubtedly the largest consumers of aluminum in the country, and if they have found it advantageous to employ this metal for their canteens, cooking pots and water bottles, all of which are subjected to exceedingly rough usage, it is not easy to see why it has not found a greater degree of favor with the native population.

It will not be far from the truth to say that the great bulk of the Europeans in India use aluminum cooking utensils in preference to any other, and the general consensus of opinion is that they are well suited to their requirements. Unfortunately, in native cookery, the use of such acids as acetic acid, citric acid and tartaric acid combined with salt is very common, and experience shows that these acids in combination with salt have a rapid corroding action. Obviously, therefore, aluminum pots are not likely to be used to make curry in. But there is no reason why they should not be employed for water xessels, or in place of tin pots, which are largely manufactured in such places as Kumbakonam, for ghee, buttermilk and similar fluids. The salts and compounds of aluminum are absolutely non-poisonous, and in this respect the metal possesses an enormous advantage over copper and tin and their alloys, all of which are highly poisonous. Moreover, the enamelled iron ware, which is generally considered such an absolutely safe material for cooking in, is only so when the interior lining is perfectly intact. It will not, I think, be difficult to prove that where aluminum is invariably used for cooking utensils, there is a greater freedom from violent derangements of the digestive organs, which are not at all uncommon in India, and for which usually no rational explanation can be found.

The effect of the Swadeshi movement upon the aluminum industry in Madras has been imperceptible, notwithstanding the fact that the industry is an experiment in Swadeshism which was started years before that word was coined, and which will ultimately lead to the establishment of aluminum-producing works in India, where the metal will be extracted from indigenous materials. At present it would seem that the day is yet far distant when India will be able to supply its own requirements in aluminum, but when that time comes it will be a considerable step towards making India self-supporting in respect of the demand for softer metals. On a large scale there is no doubt that aluminum can be produced very cheaply in India, and it could probably be sold at a price which would enable it effectively to oust brass and copper from the position they now hold in most Indian homes.—Alfred Chatterton, in the Madras Mail.

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### HARDENING PLASTER OF PARIS.

By D. J. Lemal.

There are several ways of making a harder substance than common plaster of Paris mixed with water. The dry plaster article may be soaked for 24 hours in pure linseed oil and then dried. It may be coated with a thin hot solution of glue water, or soaked in a hot solution of alum or borax. Plaster may be hardened by mixing it with a small quantity of fine corn flour or ground rice. Mix 6 parts of plaster with 1 part of finely sifted unslacked lime; coat several times with a hot saturated solution of sulphate of zinc. If color is no object sulphate of iron will do; this will turn it a leathery color. Another way is to coat the plaster with a strong soap suds until saturated, then apply a hot solution of chloride of barium. Fifteen or 20 drops of silicate of soda to each part of hot water will cause plaster to set very quickly.

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Figures compiled by the Geological Survey place the production of bismuth in the United States for the year 1905 at 24,409 pounds, containing 2,288 pounds of metal valued at $4,187.

## SAN FRANCISCO NEWS.

(From Our Special Correspondent.)

I send herewith snap shots of some of the San Francisco shops that are doing work under difficulties. Fig. 1 is a view of Murray Brothers' machine works, corner Folsom and Beale streets. They are right out in the open, and are only protected from wind and dust by a board fence, but there is no roof. They make a specialty of hoisting machinery and donkey engines, and there has been a big demand for that line of machinery. The firm did not wait for the insurance adjusters, but went right to work on the ruins of their old plant. Murray Brothers use heavy bronze gears cast at the works of M. Greenberg's Son.

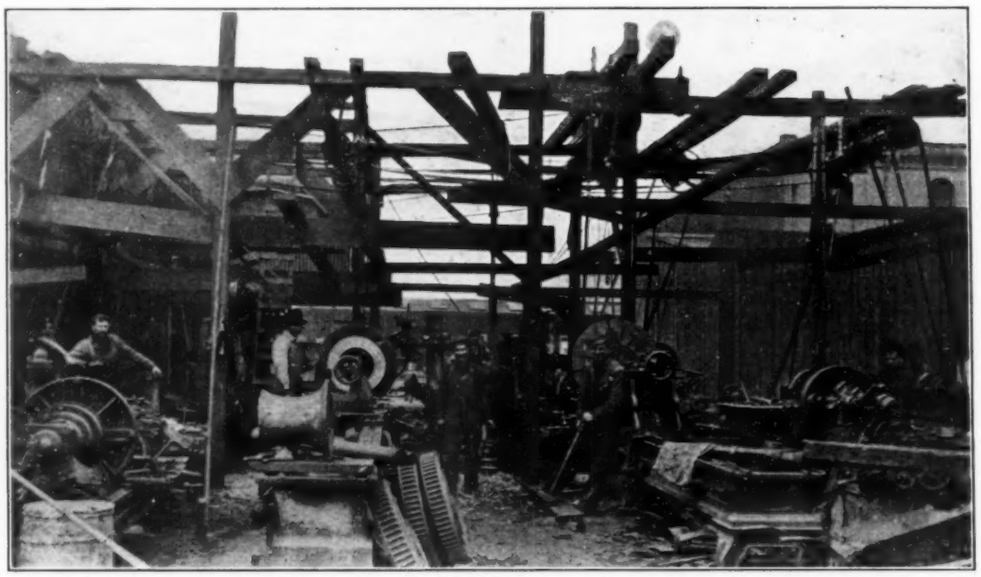

FIG. 1.—MURRAY BROS.' MACHINE SHOP IN THE OPEN.

Fig. 2 is a view of the chandelier works of the Thomas Day Company, Mission street, between 3d and 4th. The workmen are removing the debris and picking out the brass remnants of the fixtures. In the temporary building at the rear new fixtures and brackets were made at once to supply the demand after the fire. This company is the oldest and largest chandelier manufacturing establishment on the Pacific Coast. In connection with this firm it may be interesting to note that in the year 1868, when the Palace Hotel was built by the Bonanza Kings, Thomas Day had the contract for furnishing all the gas fixtures and chandeliers, also the locks, window catches and house hardware. Every bit of it was made in the factory of the Thomas Day Company, as the contract called for home products only.

FIG. 2.—RUINS OF PLANT OF THOMAS DAY COMPANY.

Both of the above mentioned companies are now building large shops, which will be ready for occupancy before long.

The damage to the Cogswell Polytechnic College is being rapidly repaired, and the fall term has opened with 112 students in the three upper classes.

Lyman Cole, for many years foreman polisher and

plater with the A. Merle Company, has interested himself with the Western Novelty & Plating Works.

Graff & Son, metal spinning and electroplaters, have started again at 33 Clementina street.

Sonders & Company, Chas. Scharlitz, proprietor, brass foundry and copper works, have finished their new building at the corner of Beale and Howard streets.

The Bauer Lamp & Reflector Company have established themselves at 528 Gough street, and the Calif Watch Case Company is busy again at 803 O'Farrell street.

The Dow Pump & Engine Manufacturing Company are still rebuilding their brass and iron foundries and machine shops at the corner First and Howard streets. They employ over 300 men in their temporary quarters.

The Victor Engine & Motor Carriage Company are very busy at 252 Spears street, and the A. Schneider Engineering Company at 2140 Folsom street.

The B. W. Norton Tool and Die Works are doing a good business at 858 Market street, Oakland. Mr. Norton was the foreman diemaker with the Shreve Company before the fire.

The Schaefer Coppersmith Company has to work overtime to keep up with its orders at 230 Folsom street.

The James Graham Manufacturing Company at Newark, Cal., have enlarged their polishing and plating plant.

Tuckey & Kline, manufacturing jewelers, have established themselves at 1514 Buchanan street.

W. K. Vanderslice, gold and silversmith, is at 1616 Van Ness avenue.

Just after the fire many of the residents were compelled to seek living quarters elsewhere, but they are rapidly returning and the population is now estimated at 370,000. The following is a general summary of the business condition for the past month:

August building permits issued, 1,176; value, $6,333,363. Real estate transfers recorded, 1,075. Building contracts recorded, 170; value, $1,429,114. Bank clearings, $180,844,594.73; for August, 1905, $155,841,918.86. Per cent increase, 16. Tonnage of port of San Francisco, 157,370. Permanent buildings under construction, 711. Value of buildings on which work is being done, $50,000,000. Number of men doing construction work, 30,000. Average number of cars of debris removed daily, 125.

## NEW STANDARD SCREW THREAD.

The Association of Licensed Automobile Manufacturers, with headquarters in New York city, have proposed a new standard thread for bolts and nuts under 1 inch in diameter. A finer thread than the U. S. Standard has been found necessary and the new standard is intended to fill this want. The following table gives the proposed pitch:

| Diameter. | Pitch. | Diameter. | Pitch. |
|---|---|---|---|
| ¼ | 28 | 9-16 | 18 |
| 5-16 | 24 | ⅝ | 18 |
| ⅜ | 24 | 11-16 | 16 |
| 7-16 | 20 | ¾ | 16 |
| ½ | 20 | ⅞ | 14 |
| | | 1 | 14 |

The tensile strength of the steel for nuts and bolts is to be 100,000 pounds per square inch and the elastic limit 60,000 pounds per square inch. Where screws are to be used in soft material the existing standard will be used. The new standard applies only to steel.

## SPEEDS FOR COLD BRASS ROLLING.

By A. W. Limont,

Until about twenty years ago the speeds of sheet brass rolling mills were from 9 to 16 or 20 revolutions per minute. The breaking-down rolls, 20 x 36 inches, for breaking down the cast brass ran from 9 to 12 revolutions per minute; 18 and 16-inch rolls from 12 to 16 revolutions. Since that time quite a change has been made in the speeds of all sizes of mills. Breaking down mills at the present time are furnished with 20 or 22-inch diameter rolls from 30 to 36 inches long, and are run from 18 to 22 revolutions.

Running down rolls, which are generally the same size as the first, were formerly run from 9 to 12 revolutions, but are now run from 26 to 30 revolutions, and in one or two cases as high as 45 revolutions for 20 x 36-inch rolls. Finishing rolls are generally 18 or 16 inches in diameter and from 30 to 36 inches in length; they were formerly run from 16 to 20 revolutions and are now run from 40 to 60. Wide sheet rolls 40 to 60 inches in length and 20 to 24 inches in diameter were run from 9 to 12 revolutions and are now run from 26 to 30.

The speeds of the rolling mills have not only been greatly increased but the amount of the reduction at each pass has also been increased, especially during the first stages and running down passes. What was formerly done in three or four passes is now done in two, and proportionately through all the passes to the finishing thickness. This increase in speed and in the work demanded of the mill has necessitated the re-designing of all sizes of mills. At the present time a mill of a given size will weigh three times as much as one of corresponding size 20 years ago.

The writer designed and erected a pair of 20 x 36-inch mills for breaking down, which were run at 18 revolutions per minute. The roll frames or housings weighed something over 14,000 pounds each. The body of the rolls was 20 inches in diameter by 36 inches long; the roll necks or bearings were 16½ inches in diameter by 16 inches long. This mill was to replace one of the same size, 20 x 36 inches. The weight of the old frames or housings was 6,700 pounds each. The necks or bearings of these old rolls were 13½ diameter by 9 inches long. This mill gives a good idea of the change that has taken place in the construction to meet the demands of increased speed and pressure.

The finishing mills 16 or 18 inches in diameter now running as high as 60 revolutions per minute are also greatly altered as regards the weight and strength of the frames and the size and length of the bearings. In 16-inch rolls running as high as 60 revolutions, the necks are 12 inches in diameter and 12½ inches long, where formerly they were made 9 to 12 inches in diameter and 8 to 9 inches in length.

Of course this speeding up has increased the load upon all the driving gear back to and including the engine, and has necessitated the installing of modern heavy duty engines in all the mills. At the same time it has increased the output far beyond the fondest hopes of our forefathers in the business.

### HOT COPPER ROD ROLLS.

The speeds of hot copper rod rolls successfully used are as follows:

3 high 16 x 54-inch roughing rolls..... 110 r. p. m.
3 high 10 to 9-inch finishing roll train.... 325 r. p. m.

A mill of this size well erected and laid out can turn out about 70,000 pounds of ⅜ copper wire rods in 10 hours.

### SILVERWARE IN ENGLAND.

American Consul Frederic I. Bright advises that there is a good and general demand for electroplated hollow ware in the Huddersfield consular district, England. He says: The following lines are found in the market to meet the requirements of trade: Biscuit jars, casters, cake baskets, coffee sets, berry or fruit dishes, cups and saucers, fern dishes, jewel boxes, loving cups, napkin rings, pickle dishes, punch sets, sauce boats, butter dishes, sirup pitchers, tea sets, water sets, trays, waiters, and various novelties. The following lines are kept in stock by dealers, but the demand for them is small: Candelabra, puff boxes, toilet sets, lavatory sets, and urns. Crumb sets are to be found in what may be called the English equivalent, but having a different name. The baking dish, popular in the United States, is not found in this district. Formerly nearly all of such wares were in electroplating, but in later years the demand has greatly increased for the standard silver in the smaller wares and novelties. Thus it would now seem that the most promising field for electroplating would be in the larger lines. There is another reason for this. The ordinary purchaser of these wares from the retail merchant is not a little distrustful of his own ability to judge the merits of electroplating as to its quality and durability. He has, however, implicit confidence in the Government stamp, the "Lion Passant," which is required by law to be stamped upon all silver plate, whether of foreign or domestic origin, as a guaranty that it contains at least 11 ozs. 2 dwts. of silver to the pound troy, and it is therefore natural for the purchaser to buy the silver plate which has been assayed and marked as above when within his means.

It is provided by law that imported gold and silver plate must be first officially assayed, stamped, and marked before being offered for sale in the United Kingdom in the same manner as any ware made locally, but with the addition of the letter "F." If any imported gold or silver plate is found to be of coarser alloy than the standards, such ware is cut, broken and defaced at the assay office. In explanation of the law quoted it may be said that the term "silver plate," as used, is meant to include only what is commonly known as the "solid silver" or "standard silver." As to the electroplated ware there are no such restrictions, except those applying to all manufactured articles, by which it is illegal to sell goods in England containing any "false trades description," and manufactured goods are stopped by customs officers at the port of entry if they contain any false trade description. Any mark upon ware which amounted to a "direct or indirect statement or indication" that the ware was made in England would be a false trade description within the meaning of the law. Goods bearing the mark or initials of the English importers or of the agents in England to whom the goods were consigned would be considered a false trade description, unless it were accompanied by a qualifying statement showing that the goods were in fact made in the foreign country.

American electroplated ware is not represented here, the English goods having almost exclusive control of the market. There is a very small quantity of the German, for which there is little demand. There are no wholesale silverware dealers in the district and the retailers buy directly from the manufacturers at Sheffield and Birmingham.

As to style, the demand is decidedly for the plain ware with bright finish, the general criticism of foreign wares being that they are too elaborate in chasing and engraving and the finish too dull. The modern designs are not entirely free from chasing and engraving, but can not be called elaborate. In antiques the "Old English" style, Elizabethan, Queen Anne, and Georgian are greatly in demand. Queen Anne and Georgian coffee sets are very popular. In the cheaper ware the silver is deposited upon what is known as "white Britannia metal" and in the better ware upon "nickel-silver." [A list of the principal retailers of silverware in the Huddersfield district can be obtained from the Bureau of Manufactures, Washington, D. C.]

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### NICKEL LINED STEEL TUBES.

A patent granted to John H. Nicholson, of Pittsburg, Pa., and assigned to the National Tube Company of the same place, describes a method of lining steel tubes with nickel. An earlier patent to the same inventor showed that a steel or iron tube provided with a welded covering of nickel, in order to give the tube a non-corrodible surface, would be subject to difficulties if the nickel linings were lighter than 15 per cent. This was owing to irregularity in the thickness in the nickel and steel which was liable to produce thin or uncovered spots in the finished tube.

This has been overcome in the new invention. In this method the compound tube with its nickel lining is placed into a pierced blank. This secondary operation of welding is accomplished by telescoping the compound tube within a heavily walled hollow steel blank, heating to a welding heat and rolling it over a mandrel so as to reduce the thickness and elongate it, thus welding the primary compound tube firmly to the steel blank. On account of the thicker lining used the nickel retains its relative thickness as compared with the steel and can be rolled and drawn into boiler tubes with a nickel lining as light as 2½ per cent. This lining is distributed evenly over the surface of the steel, which is thereby thoroughly protected from corrosion.

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### DEPOSITION OF METALS OR METALLIC COMPOUNDS UPON METALS.

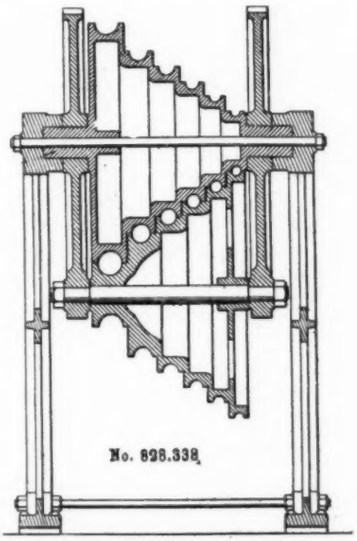
On August 28, 1906, letters patent were granted to Sherard Cowper-Coles, of Westminster, London, England, for a process for the deposition of antimony or a compound containing that metal upon articles of steel, copper, brass or other suitable metal. The articles to be treated are first subjected to a process for removing the scale or oxide and are then packed in a mass of finely divided antimony, such as commercial antimony powder. Antimony in this condition contains some oxide which renders it well adapted to this method. The air is excluded from the vessel, which is rotated so as to insure the intimate contact of the articles with the powdered antimony. The receptacle with its contents is heated to a temperature below the melting point of the antimony, the heating being maintained for a suitable period, say one hour or more, according to the thickness or depth of coating to be obtained. It has been ascertained by experiment that in one hour a deposit of about one ounce of antimony per square foot will be effected. When the process is carried out under proper conditions a non-crystalline, or in some cases a spangled coating of antimony may be obtained, and good results have been reached with antimony powder having a specific gravity of about 3.78 and containing from 20 to 25 per cent. of oxide.

# INDUSTRIAL

NEW AND USEFUL MACHINERY, DEVICES, APPLANCES AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

## PIPE BENDING MACHINE.

A simple and efficient pipe bending machine has been invented by George H. Reynolds, of Mansfield Depot,




PIPE BENDING MACHINE.

Conn., and assigned to the Pipe Bending Machine Company, a corporation of North Carolina. Supported upon a frame is a semi-cone having its curved face provided with a series of grooves. A second cone correspondingly grooved is inversely arranged and is hung so as to swing concentrically about the first, so as to be capable of bending a tube around its curved portion. The pipe is guided between the cone and semi-cone and is held during the bending. With this machine pipes of different sizes can be bent to curves of different radii.

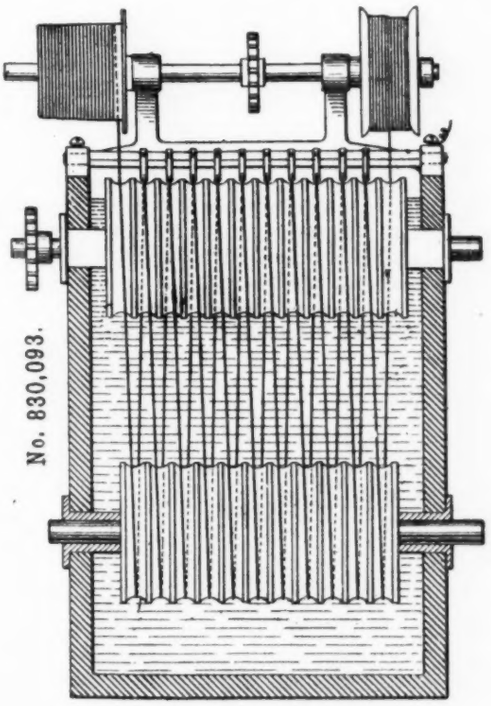
## MONEL METAL.

The hard service to which gas and automobile engine valves are subjected, resulting in pitting, scoring and breaking of the valve stems, has created a demand for something better than the material now used. A metal that is tough, strong and non-corrosive, like pure nickel, would be well suited for this service but the price, which to some takes precedence over quality, has prevented its adoption for this purpose. For some time the Orford Copper Company, of 43 Exchange Place, New York city, have devoted their attention to these requirements with the result that they are now placing on the market a natural alloy of nickel and copper, known as "Monel" metal. This has been found to be specially adapted for valves, and is claimed to possess all the desirable qualities needed, and yet at a price which permits its use in large quantities. The metal drop forges satisfactorily and takes a high polish.

The metal output in gold, silver, lead, copper, zinc and mercury of the State of Utah for the year 1905 was valued at $29,185,067.

## APPARATUS FOR GALVANIZING WIRE.

Heretofore, in electro-plating or electro-galvanizing wire, a tank or vat from 10 to 15 feet long and having a series of anodes along the sides and filled with the electrotype has been used for this purpose. This plan requires a large amount of space, and consumes a large quantity of the electric current by reason of the length of wire through which the current passes and the number of anodes required for the purpose. These objections are overcome by the method invented by Guy L. Meaker, of Evanston, Ill., assignor to the American Steel & Wire Company of New Jersey, September 4,



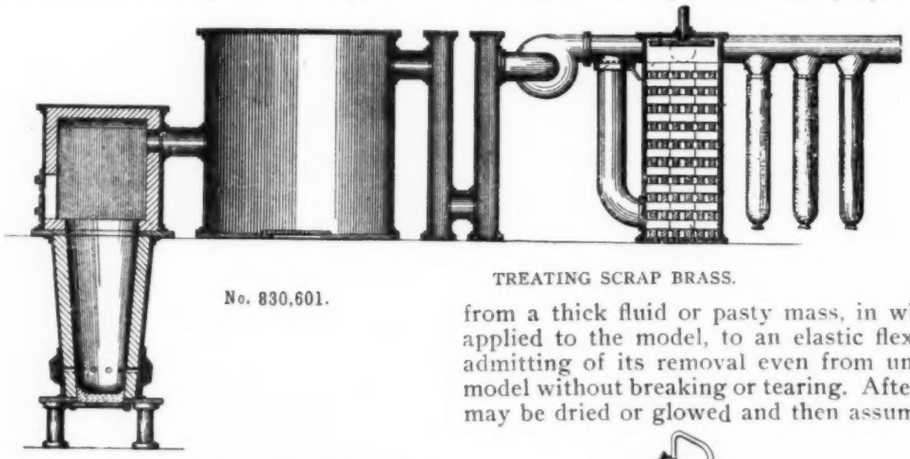

APPARATUS FOR GALVANIZING WIRE.

1906. Two or several pairs of rollers are arranged in vertical planes and immersed in the electrolyte, all except a small portion of the upper roller. Wire from the reel is drawn around these drums and the electric current is supplied to each loop, thereby greatly reducing the resistance to be overcome. By passing the wire through the electrolyte in coils and supplying the current to each coil separately a very perfect and even deposit is obtained.

Bottom poured crucibles were described and illustrated in The Metal Industry of April, 1903. The principal makers of these crucibles, The Joseph Dixon Crucible Company, Jersey City, N. J., say that few of them are used and they have made no progress since the above date, though considerable effort has been made to teach the brass founders what they are like.

### PROCESS OF TREATING SCRAP BRASS.

A new process of treating waste brass and similar alloys of copper with zinc, lead, tin and other easily oxidizable metals has been invented by Henry J. Krebs, Wilmington, Del., September 11, 1906. The method provides for the recovery of the copper in



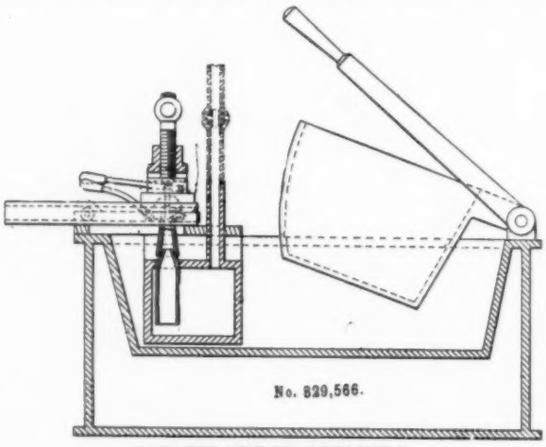
No. 830,601.

TREATING SCRAP BRASS.

metallic form and the conversion of the zinc, lead and tin into oxides. In carrying out the process the scrap brass or other alloy is melted and subjected to the action of air, preferably in a cupola furnace, thereby oxidizing the zinc, lead and tin if present. The oxides escape from the furnace as a fume and are caught in bags for use as a pigment, or may be dissolved in acid to form salts of the metals.

### CASTING UNDER PRESSURE.

A patent granted August 28, 1906, to James Beakbane, of Kingston, N. Y., and by him assigned to the Doehler & Beakbane Manufacturing Company, a corporation of New York, covers a method of rapid casting of metals in hard molds under pressure. The molten metal is delivered to the mold in volume; the pressure may be quickly applied and removed to facilitate the handling of the apparatus and the mold, and to avoid the congealing or "freezing" of the metal before the mold has been properly filled. The design is such that the working parts of the machine do not come in direct contact with the heated metal. The mold proper is maintained at a low temperature compared with the parts attached to the melting pot. The metal delivered to the mold is not materially oxidized and is practically free from impurities.

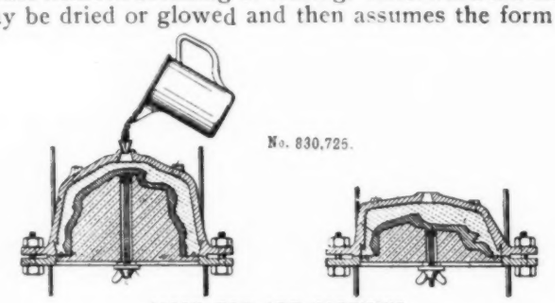


No. 829,566.

CASTING UNDER PRESSURE.

### MOLD FOR ART CASTINGS.

By this method of molding, which has been patented September 11, 1906, by Max Kuller, of Charlottenburg, Germany, it is possible to make reproductions of art or other castings in any number. The mold forming material possesses the property of changing from a thick fluid or pasty mass, in which form it is applied to the model, to an elastic flexible condition, admitting of its removal even from undercuts of the model without breaking or tearing. Afterward the mass may be dried or glowed and then assumes the form of an ordinary sand mold. The model is made in two parts which fit accurately together. Over each part is placed a flask and the mold material poured in. After this has changed to a flexible elastic state it is carefully removed. When it has become hard the two parts of the mold are joined together with the core and the metal to form the casting poured in. In the wholesale manufacture any number of flasks may be provided for one and the same article.



No. 830,725.

MOLD FOR ART CASTINGS.

### METHOD OF REDUCING METAL BEARING MATERIALS.

A patent granted to Alex. H. Helander, of Pueblo, Colorado, September 18, 1906, provides for the mixing of fine metallic oxides or ores with liquid or semi-liquid material to which is added finely divided solid fuel, such as coke breeze. The moistening materials may comprise tar, oil or other substances containing carbon. The mixed substance is injected into the furnace by a blast sufficiently strong to overcome the inside pressure of the furnace, the object being in every case to supply the mixed material in such condition as to prevent its being carried out of the furnace by the air blast.

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The per capita of money in circulation on May 1 was $32.22 for each inhabitant. That exceeds the record of any previous time. Most of the gain was in gold, $30,000,000 being added by imports, and gold certificates also gained about $11,000,000.

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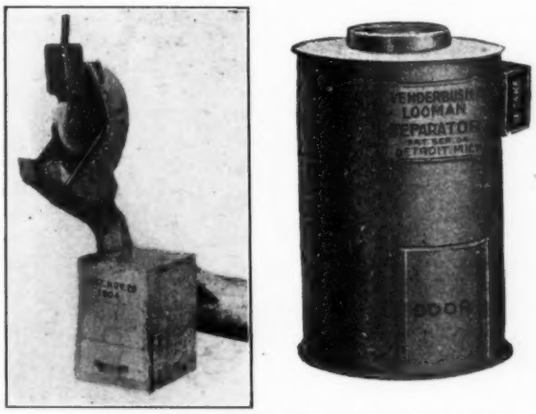
The Board of United States General Appraisers have sustained a claim made by J. Marsching & Co., New York, and held that copper plates used in printing pottery are not subject to the rate of 45 per cent as manufactures of metal.

### THE VENDERBUSH HOOD AND METAL SAVING DEVICE.

The amount of metal removed by polishing and grinding lathes is small when only one day's work is considered, but during the course of a year the metal removed is large. The patented hood and metal saving device here illustrated is designed to save this metal, which can then be returned to the melting pot. The




VENDERBUSH HOOD AND METAL SAVING DEVICE.

hood is made of heavy galvanized steel reinforced with angle and bar iron. The face and inside guard can be adjusted for any size wheel. The inside guard is for cutting the air and dust from the wheel, which drops into the box. The lower front slide is adjustable and can be removed entirely for large work. The door is on hinges with a catch at the top for changing wheels. This hood and metal saving device can be attached to any exhaust system.

The separator is cylindrical shape, made of heavy galvanized steel, and can be placed either inside of the building or on the outside. The lower part is the receiving chamber, which collects the dirt and dust and has a door for cleaning out. The device has been recently placed on the market by Venderbush & Looman, 177-179 Larned street, Detroit, Mich.

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### REDUCTION OF TIN IN STRAITS SETTLEMENTS.

Consul-General David F. Wilbur, of Singapore, states that the reports for this year made by the commissioner of mines of the Federated Malay States show a decline in the output of tin compared with last year, while the total exports show an increase for the six months of this year over those of last year.

For the first six months of the years 1905 and 1906, the shipments of tin from Singapore and Penang were as follows, given in tons of 2,240 pounds:

| Country to which shipped. | 1905. | 1906 |
|---|---|---|
| United States ..... | 10,616 | 8,040 |
| England ..... | 17,080 | 20,573 |
| Continent of Europe..... | 4,595 | 4,219 |
| Total all countries ..... | 32,291 | 32,832 |
| Increase over 1905..... | .... | 541 |

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Consul Baker, of Sydney, furnishes a tabular statement showing exports of tin ingots from New South Wales from July 1 to December 31, 1905. The total quantity exported aggregated 31,670 hundredweight, valued at $1,166,820. The principal shipments were: United Kingdom, $744,640; Belgium, $233,240; France, $36,800; Germany, $13,505; United States, $95,005.

### THE BADGER FIRE EXTINGUISHER.

The advantage of reaching a fire quickly cannot be over-estimated. Having an efficient fire extinguishing apparatus within convenient reach has often resulted in quenching a promising blaze at the start and long before it had reached the dangerous stage. The fire extinguisher manufactured by the Badger Fire Extinguisher Company, of Boston, Mass., consists of an upright copper tank 24 inches high, thoroughly well made and tested. When charged ready for use it contains 2½ gallons of water in which 1½ pounds of bicarbonate of soda has been dissolved and 4 ounces of ordinary sulphuric acid has been placed in a bottle separately in a cage at the top directly under the cover. All that is necessary to bring the device into action is to turn it upside down and in less than 5 seconds a stream of gas impregnated water can be directed on a fire from 40 to 50 feet distant. The tank can be easily recharged ready for further use.

BADGER FIRE EXTINGUISHER.

DIGGS FIRE EXTINGUISHER.

### THE DIGGS UPRIGHT FIRE EXTINGUISHER.

The fire extinguisher of to-day depends for its action upon the mingling of two materials which, before the apparatus is brought into service, are kept separate. It is very evident that the effectiveness of the device is gauged by the thoroughness with which this mixing takes place. In the extinguisher manufactured by the Diggs Fire Extinguisher Company, of 141 Center street, New York City, the acid bottle is not broken, but the release of the acid is positive and practically instantaneous. The acid, being released at the top of the tank and the outlet being at the bottom, is so completely mixed with the soda before it reaches the outlet that no harm is done to flesh or fabric with which it may come in contact. After being charged the machine requires no attention and is always ready for operation. The illustration shows a 3-gallon extinguisher.

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Exports of tin from Singapore and Penang for the first quarter of 1906 showed an increase of 190,000 pounds over last year. The total exports of tin increased nearly 900,000 for the same period.

# CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER ANY QUESTION RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

## METALLURGICAL.

Q.—How can I melt old nickel anodes so as to make them into new ones?

A.—If you have a brass foundry connected with your plant the foundryman will remelt the old anodes. For this purpose a new crucible should be used to avoid contamination with the brass with which old crucibles become impregnated. A flux of dry slacked lime and fluorspar should be used to bring the nickel to a highly fluid state. Have a pattern made of wood of the shape of the anode desired; then mold and cast in sand in the usual manner.

Q.—Kindly give me the best proportions for making both 14 kt. and 18 kt. anode gold to be used in plating solution.

A.—For the production of karat golds for anode purposes the following proportions should be used:

| | Fine gold. | Silver. | Copper. |
|---|---|---|---|
| 22 kt. gold | 22 parts | ½ part | ½ part |
| 18 kt. gold | 18 parts | 3 parts | 3 parts |
| 14 kt. gold | 14 parts | 4 parts | 6 parts |
| 12 kt. gold | 12 parts | 3½ parts | 8½ parts |
| 10 kt. gold | 10 parts | 4 parts | 10 parts |
| 8 kt. gold | 8 parts | 5½ parts | 10½ parts |

These figures are based upon troy weight and that weight should be used.

## PLATING AND FINISHING.

Q.—I am informed that a Philadelphia concern is successfully galvanizing sheets by electricity. Will you inform me whether the following mixture can be applied electrically to iron and steel sheets and give me the proper "bath solution" for applying the same? Spelter 91 2-10 per cent, tin 8 per cent and aluminum 8-10 of 1 per cent. This metal when thoroughly mixed at a high temperature has a beautiful aluminum appearance.

A.—We are of the opinion that it is possible to produce an electro deposit of the formula mentioned. We would advise you to try the following:

| | |
|---|---|
| Zinc sulphate | 1½ lbs. |
| Stannous chloride | 5 oz. |
| Aluminum sulphate | 2 oz. |
| Commercial glycerine | 1 oz. |
| Water | 1 gal. |

Dissolve the zinc and tin salt in two-thirds the water slightly warm. In the remaining one-third dissolve the aluminum salt and the glycerine and mix the two solutions. Prepare your anodes according to the formula you mention. After making up the solution hang the anode in A for 10 or 12 hours before working; it will stand from 15 to 20 baume. The currents should be at least 6 volts and the amperes at least 20 for each square foot of surface; but the proper amount can best be found after experimenting with the solution. In cleaning the sheet from scale a solution of commercial hydrofluoric acid should be used consisting of 1 part acid to 15 parts water and ¼ lb. metallic zinc dissolved in each approximate 2 gallons of solution. After thorough cleaning the sheets should be well washed and immersed in a dilute solution of 1 oz. 26 per cent ammonia to each gallon of water. Then rewash and place in the bath. For the hydrofluoric acid solution lead lined tanks or wood tanks heavily coated with asphaltum must be used.

Q.—Does a nickel solution act when it is too acid or too alkaline? What is the remedy?

A.—When a nickel solution becomes too acid the deposit is apt to peel. There is a copious evolution of hydrogen bubbles and a tendency only to deposit with a powerful current. The remedy is to add 3 ozs. 26 per cent water ammonia to each 1 oz. of 66 per cent sulphuric acid added in excess. When the solution is alkaline peeling frequently takes place; the deposit become dull and brownish stains appear when drying out in the usual manner. The remedy is to add dilute sulphuric acid or boracic acid until the solution is faintly acid to blue litmus paper, which should show a pinkish color when immersed in the solution for one or two minutes.

Q.—What do you consider the best black dip for brass plated iron, soft metal, etc., that is to be relieved by tampico wheel and pumice?

A.—The ammonia carbonate of copper solution. For one of the best formulas ever published see the article on oxidizing brass in the May, 1905, number of THE METAL INDUSTRY.

Q.—(1) Do you know of any practical method of electro-plating with manganese? Should the articles be first copper plated? (2) Can you inform us as to a process for giving manganese a black oxidized finish?

A.—(1) We are unable to give you formulas for electro depositing of manganese that to our knowledge have been commercially used with success. A solution of the following composition might possibly answer the purpose:

| | |
|---|---|
| Sulphate manganese | 5 oz. |
| Chloride ammonia | 12 oz. |
| Water | 1 gal. |

This solution should be used cold. Anodes of manganese should be used if possible; if not use sheet carbon. If deposits of basic salts of manganese take place add 1 or 2 ozs. of ammonia citrate to each gallon of solution in use. The current strength should be equivalent to that used in nickel plating. Articles should be slightly coppered for good results. (2) For the production of a black oxidized finish upon steel or electro deposits of manganese, proceed as follows: Prepare a saturated solution of nitrate of manganese and add of this from 10 to 20 ozs. to each gallon of water. After immersion the articles should be heated to a temperature of at least 650 degrees, when the nitrate of manganese will become transformed to the peroxide or black oxide of manganese. The proper heating can perhaps be best done by heating potassium nitrate in an iron crucible to its melting point and adding to this 1 or 2 parts of the black oxide of manganese. Prepare the articles as mentioned and then immerse in the potassium for a few minutes; remove and cool in paraffine oil.

Q.—Can you furnish me with a formula for gun metal finish? We have used the liver of sulphur finish and it

is not satisfactory. We want something that is not too expensive and that makes a uniform color.

A.—See Criticism and Comment, page 226, THE METAL INDUSTRY for September, 1906, for formula for gun metal finish, with remarks by Wm. Voss. Two ounces of sulphate of copper should be a sufficient quantity to add to the gallon of solution. For the best results the articles should be only bright acid dipped and plated as fast as finished. A strike in the nickel solution produces excellent results. A gun metal lacquer should be used.

Q.—We are having trouble in getting a rich color on our Roman work. The color is not deep enough. On chain and engraved work it is all right, but on smooth articles it is not rich enough.

A.—It is our opinion that your solution contains a little too much free cyanide; add a little free chloride of gold and increase the temperature—with a rising temperature redder and richer deposits are obtained. For producing karat colors cyanide of copper is added to the solution in the proportion of ¼ part copper to ¾ part gold. If you do not obtain rich enough color you might experiment with a little cyanide of copper added to your solution. Your anode is probably alloyed with or contains silver; if this is the case lighter colors will result when using a strong current. Two to 2½ volts should be ample.

Q.—Will you publish a good formula for cheaply and effectively silvering small articles such as label eyelets?

A.—A solution for dip silvering that will give excellent results for small articles of brass or copper is the following:

| | |
|---|---|
| Caustic potash | 20 ozs. |
| Cyanide potassium | 14 ozs. |
| Chloride silver | 2 ozs. |
| Water | 5 gals. |

To prepare the solution dissolve the potash in two-thirds the water, and the cyanide in the remainder. Then add the silver and mix the two solutions. Use at a temperature of 120 to 140 degrees. In connection with this solution it is well to use a nearly boiling solution of plater's compound, using 2 oz. of the compound to each gallon of the water. After silvering wash and immerse in this boiling solution for a few minutes. Drain and wash in boiling water and dry out in maple sawdust. By this method the articles will remain bright for a great length of time without lacquering. The silver dip can be replenished by adding a small amount of concentrated solution of chloride of silver in cyanide of potassium as occasion requires.

Q.—Will you inform me how to obtain a fine gold color without the use of gold? This method must be practicable on goods in bulk.

A.—The only method we are familiar with for producing a gold color on brass without the use of gold is the bright acid dip, then lacquering and then dyeing in a solution of aurine aniline dissolved in fusel oil. This plan is followed successfully down east, and from samples we have seen the articles look equal to gold plated. Manufacturers of lacquer will give the necessary information as they handle all the materials.

Q.—I have a 200 gal. silver plating bath which I replenish with chloride of silver thrown down with salt. I have added 80 ozs. hydrocyanic acid and find that the iron wire is eating away. The work plates nice and soft soft for buffing. Do you think more acid would help?

A.—If your solution is producing such excellent results we would advise you to let good enough alone. The action taking place upon the iron anode hooks may be due to the slight excess of cyanide in the solution. As this is gradually taken up with silver the action upon the hooks will probably cease the same as it did in your other solution. It is not advisable to add hydrocyanic acid only when absolutely necessary. Add the proper proportion of cyanide when finishing up your work for the week. This gives the solution a chance to become normal by the time work is resumed.

Q.—(1) We are looking for a black finish for certain of our parts and understand there is a process known as the "bower-barff" which is used by button manufacturers. (2) We have tried the following for an anti-rust black finish for steel but it does not come as black as it should.

| | |
|---|---|
| Chloride bismuth | 1 part |
| Bichloride mercury | 2 " |
| Chloride copper | 1 " |
| Hydrochloric acid | 6 " |
| Alcohol | 5 " |
| Water | 50 " |

A.—(1) We are of the opinion that the bower-barff process used by button manufacturers upon steel buttons consists of a mixture of 1 to 2 parts of binoxide of manganese and 3 parts of potassium nitrate. This is melted in a crucible until fusion is complete and the cleaned articles are immersed in this mixture until a low red heat is produced. Then they are dipped in fish oil which is afterward removed by a hot solution of caustic potash, and dried out in the usual manner. The solution does not affect the temper of the articles. (2) The City Button Works of New York City and the Waterbury Button Company, Waterbury, Conn., are two concerns that we believe are using this or a similar process for producing a black non-corrosive finish upon steel buttons.

Q.—I am having trouble with a 450-gal. nickel solution. It stands 6½ hydrometer, and is slightly acid. The work is streaked and cloudy instead of smooth and white.

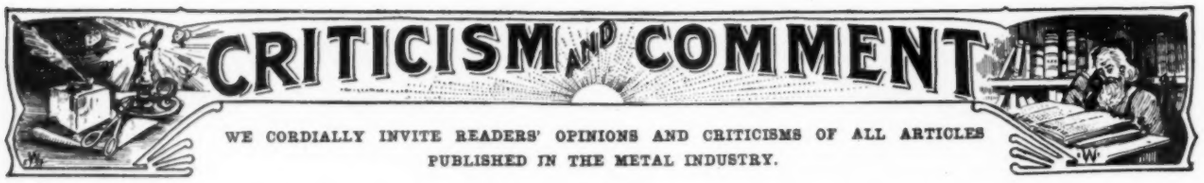
A.—From the appearance of the sample we are of the opinion that your solution is deficient in conductivity. This may be overcome by adding 1 or 2 ozs. of common salt to each gallon of solution in use. If you are plating this work in baskets the discoloration may be due to the baskets becoming too heavily coated with nickel. The porosity of this deposit, owing to the strong current used, produces ammonia which would cause the stains to appear. If your solution becomes too dense after adding the salt reduce it to 6 deg. Baume.

Q.—Will you kindly give me a formula for a black oxidizing solution (dip) for brass plated iron which must be relieved.

A.—The ammonia carbonate of copper solution produces the best results upon brass plated iron when used cold. To prepare this solution dissolve ½ lb. of the dry carbonate in 1 gal. of 26 per cent. ammonia water. When dissolved add ½ gal. warm water and 8 ozs. of carbonate of soda. The solution may be used in a short time. It is advisable to pass the articles through a potash bath after oxidizing and washing. The potash acts as a binder for the black. Relieve for antique work in the usual manner.

Q.—Can you give me a good formula for depositing gold on aluminum castings?

A.—It is impossible to deposit gold upon aluminum castings. Very few electro deposits have been obtained upon this metal that have proved to be commercially successful.


CRITICISM AND COMMENT
WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES PUBLISHED IN THE METAL INDUSTRY.

### AN IMPROVED PROCESS FOR PRODUCING DEAD LUSTRES ON BRASS ARTICLES.

To the Editor of THE METAL INDUSTRY:

It is a well known fact that the users of compound acids for dead lustres or mat finishes have to deal with lots of troubles to keep their acids at the right working point every day.

The writer has found in lactic acid a great help to obviate those difficulties; and always producing good results.

First make a mixture as follows:

Nitric acid 36° (yellow aqua fortis).....200 volumes
Sulphuric acid 66° (oil of vitriol).....100 volumes
Common salt (chloride of sodium)..... 1 volume
Sulphate of zinc (white copperas).....1 to 5 volumes
Lactic acid.....8 oz. to 5 gals. of solution

Dissolve the sulphate of zinc in the sulphuric acid, add to the nitric acid, then add the salt and when cool add the lactic acid. This mixture should be kept in an earthen jar which should be placed in a basin of cold running water to keep the acid cool when working. Lactic acid can be added to any other acid compounds now in use for mat finishes with great advantage.

AN OCCASIONAL CORRESPONDENT.

### DETINNING.

To the Editor of THE METAL INDUSTRY:

Regarding the article on Detinning, by Howard G Bayles, published in the July issue of THE METAL INDUSTRY, the alkali-electrolytic process, which Mr. Bayles touches on in his article, has been fully described by Mennicke in Zeitschrift fur Electrochemie, Vol. 8, pages 315, 357, 381, and is the process used at Essen, Germany, and at many other places in Germany and used by both the American Can Company and the Vulcan Detinning Company in the United States. The article referred to was written by a practical man and gives many details concerning the process, which can hardly be said to be "secret" any longer. The electrolytic-alkali process is considered by all authorities to be superior to the acid processes and is probably the only really good electrolytic process in use.

The electrolytic-alkali process has, however, certain drawbacks which prevent it from being at all an ideal process. The detinning is not complete, the tin is recovered in a spongy state, the electrolyte becomes contaminated after awhile and must be occasionally renewed and the tin contains all the impurities which existed in the tin coating of the original scrap. The writer considers the method patented by himself and F. von Kugelgen (American patent 783,726, Feb. 28, 1905) as much superior to the present electrolytic-alkali process. This process consists in removing the tin coating from "white scrap" by a solution of dry chlorine in an anhydrous liquid and has been acquired by the Tin Products Company, a corporation of the State of New York. The process is fully described in the patent specifications and has been developed to a commercial point with entirely satisfactory results. Goldschmidt in Essen is, judging from recent publications and patents, replacing the electrolytic-alkali process by a process using chlorine gas. His United States patents, however, cover only unimportant modifications of the von Kugelgen-Seward process as thoroughly protected by the U. S. patent No. 783,726 mentioned above. Yours very truly,

GEO. O. SEWARD.

Holcomb's Rock, Va., Oct. 3, 1906.

### DUST FROM BUFF WHEELS.

To the Editor of THE METAL INDUSTRY:

In reference to the editorial, under the above heading in your August issue, would state that the condition must certainly be very unusual to be as stated. The writer has never seen a buffing room without an exhausting system in it that did not have dust all over it, and in most all cases, the men's faces and clothing were completely covered.

In the Geo. A. Ray Mfg. Company, they may have very large pieces to buff, and no doubt it is practically impossible to place a hood in such a condition that it would catch all of the dust and still allow them to buff their work, but it is a pretty sure thing that they could place a hood in such a way that 75 per cent of this dust would be caught.

Most of manufacturing concerns, who have buffing rooms, desire a dust exhausting arrangement as much for their own protection as they do for their men, as there is danger from fire, and everything in the vicinity is covered with a layer of dust.

In regard to that portion in which they state that fires are caused by these systems, we have never yet had but one system in which they had a fire, and this was caused by the operator getting the buff on fire, and, of course, that lighted the accumulation of dust in the dust house.

It is very easy sometimes to have a fire where they have buffing wheels and grinding wheels on the same system, as the sparks from the grinding wheels will sometimes ignite the dust from the buffing wheels. We always advise separate systems, keeping all of the buffing wheels on the one system.

In our systems we always endeavor to trap out all of the heavy material, and not have it pass through the fan at all.

All dust exhausting systems should be cleaned out at least once a week, as there is the liability of a large piece of tripoli getting into the pipe, back of which dust will accumulate. Sometimes there will be pieces of wood, old shoes, and like material put in by the boys around the room to see what effect it would have, and the manufacturer is always on the safe side if he has his exhausting system cleaned out occasionally.

Very truly yours,
B. F. STURTEVANT CO.
By H. N. MIDDLETON,
Exhaust Dept.

PHILADELPHIA, Sept. 24, 1906.

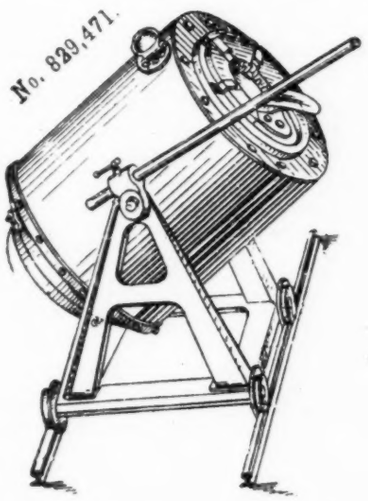
The Board of United States General Appraisers have denied the protest filed by A. Steinhardt & Bros., of New York, it being held that metal belts and ornaments are properly dutiable at the rate of 45 per cent.

# PATENTS

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

830,321. September 4, 1906. TINNING APPARATUS. Thomas A. Hickman, Chester, W. Va. This method of tinning employs a plurality of vats or tanks which are conveniently arranged to facilitate the work of tinning. The vats can be attended by one can and all can be easily and quickly cleaned.

829,471. August 28, 1906. CRUCIBLE FURNACE. Matthew Harvey, Cannock, England. This crucible is so made that it can be readily moved from place to place with the molten metal in it,




and can be tilted to pour the metal. After having received its charge the crucible can be taken as near as possible to the molds and the metal poured. By this means the loss of heat is reduced to a minimum.

831,026. September 18, 1906. SOLDERING BLOCK. John H. Allison, Elkhart, Ind. This soldering clamp consists of a base plate having a ring shaped support mounted upon it and provided with oppositely arranged segmental clamps pivoted above the ring. The article to be soldered is supported above the base and is accessible from all points.

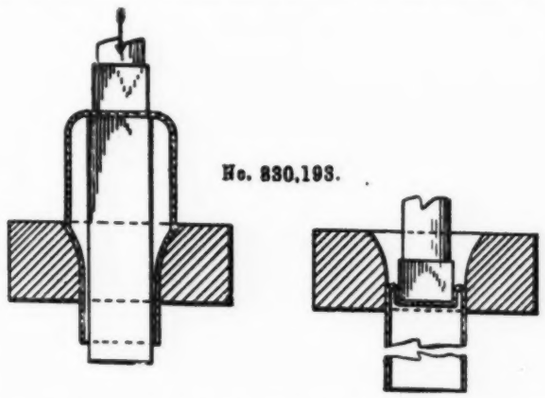
830,278. September 4, 1906. PYROMETER. Francis J. Albrecht, Pittsburg, Pa. In this pyrometer the indicating mechanism is operated by the expansion and contraction of a composite tube made of brass and iron. The device uses no springs or other delicate mechanism and the liability of breakage or disarrangement is reduced to a minimum.

831,916. September 25, 1906. ELECTROSTATIC APPARATUS. Millard Woodsome, of Bosfon, Mass., assignor to the Huff Electrostatic Separator Company, a corporation of Maine. In this classifier the peculiar properties of static or high potential electricity are made use of to affect the separation and classification of the various substances. It is applicable to a mixture where the constituents are of differing susceptibility to the repellant effect of an electric charge.

832.001. September 25, 1906. TUBE CORRUGATING MACHINE. Emil R. Stasch, Corning, N. Y. This machine provides a traveling mandrel and corrugating rollers arranged to traverse the length of the tube or pipe to be corrugated. The invention also provides means by which the upper supported end of the tube may be crimped or tapered to correspond with the corrugations. The drawing shows the construction.

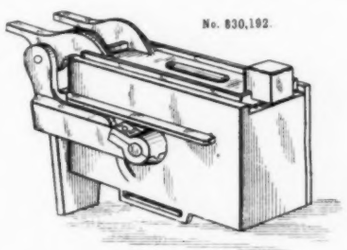
831,604. September 25, 1906. METAL CASTING MACHINE. F. DeCardy, of Chicago, Ill., assignor to the White Brass Castings Company, of the same place. This invention provides improvements in metal casting machines by which the molten metal, fusing at a high temperature, may be successfully used in the production of commercial articles possessing a hard, smooth finish and in a condition ready for use without the necessity of dressing by hand.

830,193. September 4, 1906. METHOD OF MANUFACTURING SEAMLESS PLATE METAL VESSELS OF ANGULAR CROSS SECTION. Otto Anderson, of Olofstrom, Sweden. In the ordinary draw-




ing of rectangular vessels the superfluous material always occurs at the sides and not at the corners. And as thin metal plate has more of a tendency to fold than be upset the result is a number of creases along the sides. By means of this invention the surplus metal at the bottom will adjust itself in a regular fold on each side of the angular bottom. These folds may be afterward deflected either toward the bottom or sides or may be bent inward.

830,192. September 4, 1906. MOLD FOR MOLTEN METALS AND MINERALS. Richard H. Adams, Toronto, Canada. This is really an expanding mold in which the heat employed to liquefy the mateial becomes latent in the liquefied mass, and is partly ab-




sorbed by the mold when the molten mass has been poured therein. This causes the mold to expand and permits the liquefied mass to occupy a larger bulk than the internal dimensions under normal conditions would allow of.

831,684. September 25, 1906. POLISHING DEVICE FOR ROLLS. Ambrose Ridd, Newport, Ky. This device is applicable to rolls that must be kept absolutely clean and free from foreign substances. The polishing device is so designed as to be held constantly against the surface of the rolls.

830,283. September 4, 1906. APPARATUS FOR OBTAINING ZINC. John Armstrong, London, England. In this method the zinc ore is in the condition proper for its treatment by the ordinary retort process. By the new method large quantities of the ore are treated automatically and continuously and there is a continuous flow of metallic vapor into the condensers. The device maintains a uniform temperature in the chambers and the condensers, both of which are regulated to any desired degree.

# TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

George Stewart, of Marion, Ind., contemplates starting a brass foundry.

The Warner Instrument Company will build a plant at South Beloit, Wis.

The Albert Curry Company, of Providence, R. I., toolmakers and machinists, has passed into liquidation.

The Johnstown Foundry, Machine & Car Company, of Johnstown, Pa., has been sold to Geo. P. Suppes & Son.

Jenkins Brothers, Lt., of New York city, will build a large valve factory at Montreal, Canada, at a cost of $200,000.

The Benedict Manufacturing Company, of East Syracuse, N. Y., have purchased the metal shops of the Edw. C. Howe & Company.

Zeh & Hahnemann, manufacturers of presses, dies and machinery for working metals, have moved to Vanderpool and Avenue A, Newark, N. J.

The recently organized Stimpson Scale & Manufacturing Company, of Northville, Mich., manufacture a full line of wagon, stock, and portable platform and truck scales.

M. C. Canfield & Son, 93 Wilsey street, Newark, smelters and refiners, will soon look for new quarters to handle the large number of orders which they are now receiving.

The Paye & Baker Manufacturing Company, of North Attleboro, Mass., are remodelling a portion of the second floor of one of their buildings so as to obtain additional working space.

The Owen C. Hassler Company, 565 W. Fullerton avenue, Chicago, Ill., manufacturers of cleaners, polishes, polishing oils and floor wax, are doing a good business with orders well ahead.

Work on the new plant of the S. Obermayer Company at Rillton, Pa., is progressing very rapidly. When completed this plant will be one of the most complete and largest in this country.

A Philadelphia firm of smelters, refiners and assayers is T. B. Hagstoz Company, Limited, who make a specialty of silver anodes and sterling silver. They also deal in gold, platinum and mercury.

The Hecht Brothers Manufacturing Company, of Woodstock, Ill., have organized a foundry business. They are in position to do all classes of work in aluminum, copper, brass and kindred metals.

Leiman Brothers, manufacturers of an improved sand blast for metal workers, platers, silversmiths and jewelers at 141 Centre street, New York city, have designed recently a blast for the use of glass workers.

Clark & Merigold, electro platers of 46 Oliver street, Newark, N. J., announce that they deposit for the trade fancy colored golds, silver, nickel, bronze, etc., on jewelry and novelties. Prompt service and good workmanship is guaranteed.

Ahern & Bergeron, of Nashua, N. H., report that they have one of the largest plating establishments in that State. They carry on a large business in gold, silver, nickel and brass plating, buffing, lacquering and oxidizing.

The Coe Brass Manufacturing Company, Torrington, Conn., which is controlled by the American Brass Company, has let the contract for the erection of another factory. The structure will be of concrete, three stories high.

The Boissier Electric Company, 478 Pearl street, New York, have improved and simplified their latest electroplating tank. They can turn them out at very reduced cost and figures which will reach even the smallest platers.

The American File & Tool Works report that the new addition to their plant at Elizabethport, N. J., will be ready in a month. It is a two story brick building 226 x 40 and will more than triple the company's present capacity.

The Jennings Silver Co., 359 Mulberry street, Newark, N. J., manufacturers of toilet sets and specialties have recently doubled the capacity of their shop and installed new machinery. They also contemplate starting a new plant.

Proposals will be received by the Bureau of Supplies and Accounts of the Navy Department, Washington, D. C., October 16, 1906, for quantities of bronze rods, sheet brass, ingot copper, galvanized steel and phosphor bronze.

Bittet Heating Furnaces are a specialty of the Kenworthy Engineering Company, Waterbury, Conn. Made in sizes to suit all requirements. They also manufacture annealing furnaces and furnaces for reducing tin and lead dross.

The Buckeye Tempered Copper & Brass Company, of Mansfield, O., began operations on the first of August and are already doing a good business in the manufacture of commutator bars and brass and aluminum castings of all kinds.

Clark & Merigold, electro platers of 46 and 48 Oliver street, Newark, N. J., do special work in gold plating and novelties. They soon expect to enlarge their quarters and handle bronze work and coloring.

C. W. Leavitt & Co., St. Paul Building, New York City, announce that they have been appointed selling agents of the firm of Joseph Kober, of Breslau, Germany, and are therefore in a position to supply oxide of antimony at a very low price.

The Calumet Mining & Milling Graphite Co., 87 Nassau street, New York, announce the completion of their mill. The machinery is now in position to turn out work and by November 15 they will be putting on the market their new crucible graphite.

L. H. Gilmer & Co., of 3952 Market street, Philadelphia, Pa., have established a new agency in charge of G. W. Gilmer, Jr., in the Mooney Building, Buffalo, N. Y., and still another agency in charge of William F. Reid, at 209 St. Vincent street, Glasgow, Scotland.

For many years the Textile Manufacturing Company, of Westfield, Mass., have manufactured coffin hardware. They are about to engage in the manufacture of toilet sets and novelties of silver plated ware. The new goods will be distributed under the name of the United Silver & Metal Company.

The Lunkenheimer Company, of Cincinnati, O., makers of brass and iron steam specialties and engineering appliances, are now making preparations for an extensive addition to their present factories at a cost of over $45,000. Increased facilities were made necessary by the growth of the business.

The Pittsburgh Reduction Company are building a small rolling mill at Niagara Falls, N. Y., which they expect to have started next spring. The rumors of a $3,000,000 aluminum rolling mill probably referred to this mill, the building of which was mentioned in THE METAL INDUSTRY last May.

W. F. Price, of Reading, Pa., has for twenty years made a specialty of large chandeliers of original design for churches and public buildings. He also has special facilities for the manufacture of a cheaper line of chandeliers. He does not make a regular line of chandeliers, but makes the goods on contract.

The Albany Brass & Iron Company, of Albany, N. Y., have bought the Gledhill shop on DeWitt street and are overhauling the property. Their brass foundry, machine shop and structural works are all running overtime. The many contracts now on hand prevent moving into the new quarters until spring.

"Thirty-seven years of practical experience in etching" is what is advertised by Max Schweizer, of 113 Kossuth street, Bridgeport, Conn. Mr. Schweizer is an expert on all sorts of etching and is ready to sell his process and install plants for reasonable terms. He is ready at any time to etch all sorts of goods.

Bismuth has been recently reported to cost $3 per pound. THE METAL INDUSTRY quotation for several months has been from $1.60 to $1.70 per pound and a firm where it may be obtained at this price is C. W. Leavitt & Co., St. Paul Building, New York city. Present quotations for 200 lb. cases are $1.50 per pound.

The McGlashan, Clarke Company, of Niagara Falls, Canada, have completed and equipped one of the most complete plants for the manufacture of cutlery, electro-plate and solid nickel silver. The building is 300 x 70 feet, partly two stories and of solid concrete. Electric power is used throughout and each department is independent.

The Iroquois Machine Company, 102 Westfield street, Providence, R. I., announce that they solicit bids for all classes of machine work, including cast iron, turret lathe work, gears, small and large, steel and cast iron, planning, etc. Blue prints and specifications furnished on application to the Iroquois Machine Company, Providence, R. I.

Rapidly growing business has compelled the Goldschmidt-Thermit Company to vacate their quarters at 179 Christopher street, New York city. They have bought ground at Cornelison and Bishop streets, Jersey City, and have erected there a factory building 165 x 75 feet. They will occupy the new plant on or about the first of the present month.

On August 14 the Globe Brass Company, of Detroit, Mich., was sold at receiver's sale to Maurice Goldberger, of Fort Wayne, Ind. A new corporation was formed under the name of the Globe Brass Works, which took over the assets of the old company. The new management will manufacture cocks, bibbs, valves, flue cleaners, and automobile accessories in brass.

The contract for the new plant of Langeskamp Brothers & Wheeler, of Indianapolis, Ind., was let to the Carey Construction Company, of Cleveland, Ohio. The Langeskamp plant was designed by The J. D. Smith Foundry Supply Company, of Cleveland, and they are superintending the construction and furnishing a lot of equipment, including a stoker furnace.

Rukenbrod & Burrell have opened an office and factory at 40 Hall street, Brooklyn, N. Y., for the manufacture of standard fireproof doors and sash metal drawn moldings. They will also make a specialty of bronze, copper and kalamein work. The machinery is now being installed, and the new firm contemplates having their shop in full operation by November 1.

The new plating apparatus described in the September number of THE METAL INDUSTRY known as "Sponge Plating," which was patented recently by Frank R. Cunningham, is now ready for the market and is sold by the Boston Sponge Plater Company, Box 3709, Boston, Mass. The new method does away with the tedious and disagreeable operation of the old way of sponge plating.

The plant of the Van Wagoner Company, of Cleveland, O., has been purchased by the Shelby Spring Hinge Company, of Shelby, O. The buying company will continue making the Van Wagoner line of ball bearing spring butts in connection with their Shelby Chief double acting floor hinge and other articles. They are now erecting a two story brick building 25 x 100 feet.

Brass and aluminum molders' flasks, every style and size for hand and machine molding, is the announcement of the Oscar Barnett Foundry Supply Company, 100 Hamilton street, Newark, N. J. All of the company's flasks are interchangeable with any of the same size which they make. Other brass foundry supplies are furnaces, drying stoves, spill troughs, clamps, boards, tongs, crucibles, etc.

Stanley Doggett, 101 Beekman street, New York City, has doubled the capacity of his plant for the manufacture of his "Perfection" compound and is now better prepared than ever to handle the heavy business of the fall trade. He can not only take care of his old customers but any new ones. He believes his plating compound to be the best in the market, and quantities of it are sold.

The Lavigne Manufacturing Company, Detroit, Mich., makers of mechanical oilers and a general line of brass goods, are erecting a two-story factory building 60 x 130 feet, and a one story foundry 35 x 60 feet, on the G. T. Belt Line and Commonwealth avenue. This company started business early this year and the increased demand for their specialties compelled them to treble their capacity.

The Byron Jackson Machine Works, now of Oakland, Cal., and formerly at San Francisco, are erecting a steel bulding at West Berkeley, 110 x 250 feet. At the present time the company are employing over 100 men, running day and night, and are in position to fill orders promptly. The present temporary shops are 60 x 150 and after the completion of the steel building next January will be used as a warehouse.

Increasing business has made necessary an addition to the plant of the Waterbury Crucible Company, of Waterbury, Conn. In the spring the company will build a large addition to the main works which will double the capacity. These improvements are demanded by the large number of orders now on hand and the steady growth of the business. The company are now doing a splendid business, shipping their crucibles to all parts of the country. They issue a pamphlet which contains information of value to crucible users.

The A. G. Fries Plating Company, Buffalo, N. Y., have outgrow their Main street plating works and have moved to 330 Washington street, where they not only have larger quarters and better equipment, but have added a new branch of plating, viz.: electro-galvanizing, which they say now makes this shop one of the best equipped plating establishments in Western New York. The company have a numbzer of large contracts on hand and are in a position to give prompt service and first-class work in anything in the line of plating, electro-galvanizing and metal finishing.

The Monarch Engineering & Manufacturing Company, of Baltimore, Md., have purchased more ground at Curtis Bay and are erecting an additional building 50 x 75 feet. They are very busy on orders for their melting and refining furnaces. They are working on orders for Birmingham, Eng., Nova Scotia and Buenos Aires. They have recently sold the following furnaces: 3 to C. W. Moore, Bridgeport; 2 to Whitlock Coil Pipe Company; 2 to Excelsior Brass Works; 3 to Day Foundry Company; 3 to Standard Roller Bearing Company; 3 to Wm. Sellers & Company.

In a few weeks the Springfield Facing Company, of Springfield, Mass., will be running in better shape than before the fire as they are installing machinery in an entirely new building, fireproof throughout. Their sifting machinery is largely made of wood, and is liable to burn, but the company have every reason to believe that the building itself cannot burn, as there is not a stick of timber in the entire structure. The only wood is in the win-

dow frames and doors, and the latter are tinned over to make them fireproof. The roof and floors are of reinforced cement constructure.

The Flexible Metallic Tubing Company, of New York, have moved their New York office from 133 W. 65th street to 86 Warren street and have changed their name to the Pennsylvania Flexible Metallic Tubing Company, which is the same title as that of their main office, 1305 Arch street, Philadelphia, Pa. The company are agents of the United Flexible Metallic Tubing Company, of London, England, who are said to be the only successful manufacturers in the world of heavy flexible tubing. Several firms in the United States make light flexible, but the specialty of the United is tubing used in Government vessels and for steam pressure work.

A new firm in the silverware business is E. Newton & Co., 60 Arlington street, Newark, N. J. The firm is composed of father and son, the senior, Edward Newton, who has been in the silver business for a number of years, being formerly connected with Tiffany & Co., having had charge of several departments including that of assaying and refining. The junior member of the firm, Edward E. Newton, has been with the Gorham Manufacturing Company for 10 years and was in charge of their electro plating department. Both men are thoroughly familiar with the business and make sterling silverware, do repairing, silver plating, gilding and refinishing. One of their specialties is hotel and club work. Edward E. Newton also gives expert advice on plating and silversmithing.

Firms looking for the latest fire alarm and safety devices can get some useful information by visiting the new plant of the Zucker & Levett & Loeb Company, 524 W. 25th street, New York City. It has been recorded in these columns how the firm was visited by a disastrous fire last May from which they have now completely recovered and Superintendent Backus has not only equipped the new factory with various extinguishing devices but has put in some apparatus of his own which includes an annunciator fire alarm board by which different parts and all of the factory can be signaled and a counterbalance fire escape which is readily lowered in emergencies. The company now have their new and large factory going in much better shape than formerly and are very much pleased that every one of their old employes has returned to work with them. Business is very good with the company and since the first advertising of their new revolving plating apparatus in THE METAL INDUSTRY they have sold 15 of these machines.

## FIRES

The works of Chas. T. Voigt, Camden, N. J., were recently damaged by fire to the extent of $5,000.

Cook Brothers Brass Foundry, Traverse City, Mich., was injured by fire on September 26; damage $4,000.

J. B. Taidiff's foundry at Blessville, Canada, was injured by fire on September 26 to the extent of $15,000. Insurance $2,000.

On September 21 the plant of T. L. Clark & Company, Montreal, Canada, was damaged by fire. The loss to the brass foundry was $5,000.

A fire damaged recently the brass foundry of William Duncan, 412 Border street, East Boston, Mass., to the extent of $4,000. The management will rebuild at once and soon be in shape to take care of their increasing business.

## PRINTED MATTER

ALUNDUM. Norton Emery Wheel Company, Worcester, Mass. This new abrasive is made in electric furnaces at Niagara Falls. It is used exclusively in the Norton grinding wheels.

STEEL PRESSURE BLOWERS. Bulletin No. 134. B. F. Sturtevant Company, Hyde Park, Mass., relates to high pressure types of fan blowers for foundry and similar uses. It contains a valuable table of fan capacities for various sizes of foundry cupolas.

HINGES AND HARDWARE SPECIALTIES. The Shelby Spring Hinge Company, Shelby, O. Catalogue. The floor hinge made by this company simply rests upon the floor and it is not necessary to cut away the floor to apply it. The tension of the spring can be regulated at any time after the door has been hung, thus enabling one to adjust the swing of the door as desired.

CAPSTAN CABLE JACK. Pedrick & Smith, Germantown, Philadelphia, Pa. Circular. This jack is intended for lifting cable drums and holding them while unwinding them in laying underground cable. The appliance was gotten up for the use of telephone and electric power companies; it is also applicable for handling the large reels or drums of lead pipe.

MACHINERY, METALS, HARDWARE, TOOLS AND SUPPLIES. Patterson, Gottfried & Hunter, 146-150 Center street, New York city. This is a large catalogue of some 767 pages dealing with their very extended lines of tools by complete assortments of emery, rouge, tripoli, and a great variety of buffs. The catalogue is bound with covers that permit of the ready insertion of new matter.

MECHANICAL OIL PUMPS. Pamphlet. The Lavigne Manufacturing Company, Detroit, Mich. These pumps are provided with a micrometer adjustment. The pump indicates with mathematical accuracy the amount of oil, in cubic inches, which it delivers to each cylinder or bearing. Each feed can be independently regulated. The markings on the micrometer enable the operator to vary the capacity of each stroke of each plunger by the 005 part of a cubic inch.

DATA CONCERNING PLATINUM. Baker & Company, Newark, N. J., and 120 Liberty street, New York City. This is the 12th edition of this valuable pamphlet. The subject matter embraces many new tables, and presents illustrations and descriptions of the various articles made of platinum. All of these products are the best obtainable and neither pains nor expense is spared in the process of manufacture, or in the thoroughness of inspection of the finished articles. The company manufactures all forms and sizes of platinum ware for chemical and physical purposes, either of pure platinum or any desired alloy. All of this ware is hammered to shape, tested and finished in the best manner.

ELECTROPLATING DYNAMOS. STEEL, STONE AND ACID PROOF TANKS. Bulletins "A" and "D." The Dow Chemical Manufacturing Company, Mansfield, O. The first bulletin deals with the company's latest plating and electrotyping dynamos. These machines are all constructed with a thorough knowledge of the practical side of plating as well as the electrical design. They are made from 5 to 8 volts and from 60 to 6,000 amperes. The second bulletin considers their wood, steel, iron stone, glass, lead-lined and earthenware tanks. These tanks are regularly made in a large number of capacities. The company are well equipped for lead lining wood tanks with any weight of lead desired. In lining tanks with lead all the joints are burned, thereby making the tank acid proof.

## INCORPORATIONS

Madden & Company, of Rushville, Ind., has been incorporated with a capital of $25,000 to conduct an iron and brass foundry.

The Globe Metal Company, of Jersey City, N. J., has been incorporated with a capital of $50,000 by J. J. Treacy and C. C. Clinton.

The Ornamental Bronze & Plate Company, of Kingston, N. Y., has been incorporated with a capital of $50,000 by G. H. Stephens and C. Hatch.

The Buffalo Metal Goods Company, of Buffalo, N. Y., has been incorporated with a capital of $10,000 by F. C. Atherton, W. F. Emerson and S. McDonald.

The Paul-Luttman Company, of Menasha, Wis., has been incorporated with a capital of $15,000 by Arthur D. Paul, John W. Luttman and W. L. Wheeler.

The Standard Sheet Metal Company, of Passaic, N. J., has been incorporated with a capital of $100,000 by J. T. Morgan, J. Dickens and E. L. Decker.

The Hamilton Manufacturing Company, of Columbus, O., has been incorporated by Lee D. Kohn and R. R. Andrews. The company will make metal specialties.

The Pioneer Press & Iron Works, of San Francisco, Cal., has been incorporated with a capital of $100,000 by F. A. Pagendarn, John Pagendarn, L. T. Andrews and J. R. Watson, Jr.

The LeValley Manufacturing Company, founders, of Milwaukee, Wis., has been incorporated with a capital of $50,000 by C. W. LeValley, D. Fraser, W. V. Sargent and W. C. Trye.

The Buffalo Metal Goods Company, manufacturers of metal goods, has been incorporated with a capital of $10,000 by F. C. Atherton, W. F. Emerson and S. McDougall, of Buffalo, N. Y. The company are making a specialty of a new coaster brake. They have a metal working shop and plating room.

## ASSOCIATIONS AND SOCIETIES

The National Founders' Association will hold their annual convention at the Hotel Astor, New York City, November 14 and 15. Reports from different sections of the country indicate that there will be a large attendance.

The American Electro-Chemical Society held its tenth annual meeting in Havemeyer Hall, Columbia University, New York, Monday and Tuesday, October 8th and 9th. A number of interesting papers were read on electro-chemical subjects. An informal dinner and entertainment was enjoyed on Monday evening, and on Tuesday afternoon the Society were to visit the American Smelting and Refining Company at Perth Amboy, N. J., or the Edison Laboratories at Llewellyn Park, N. J.

## PERSONALS

Theodore F. Frank, for 11 years superintendent of the Mansfield Tempered Copper Company, has accepted the management of the Buckeye Copper & Brass Company, of Mansfield, O.

Sir William Henry Perkin, the discoverer of the dye mauve and the "magician of coal tar," is now on a visit to this country as the guest of Prof. C. F. Chandler, of Columbia University.

Robert O. Wood, who has been superintendent of the rolling mill of the Manhattan Brass Company, of New York City, has accepted a position at night superintendent of the Chase Rolling Mill, Waterbury, Conn.

Frank J. DeBisschop, who left Waterbury about a year ago to take a position as superintendent of the Rome Tube Company's plant at Rome, N. Y., has severed his connections with that concern and has taken a similar position with the National Conduit & Cable Company of Hastings-on-the-Hudson.

R. F. Beach, who has taken charge of the Publicity Department of Patterson, Gottfried & Hunter, Limited, of New York city, has been issuing some rhymes on hardware necessities, paraphrasing some of the noted poets like Kipling, while other rhymes are original. No doubt they will do considerable in fixing the name of Patterson, Gottfried & Hunter, Limited, on the minds of prospective hardware buyers.

H. W. Newitt, who has been night superintendent at the Chase Rolling Mill, Waterbury, Conn., for the past two years has become superintendent of the rolling mill of the Manhattan Brass Company, New York city. Mr. Newitt has had 27 years' experience in the brass business, having entered the works of the Brooklyn Brass and Copper Company as a boy and when that plant was dismantled he held the position of superintendent.

## METAL MARKET REVIEW

NEW YORK, October 8, 1906.

COPPER.—Prices for standard copper in the London market show a further steady advance all through the month of nearly £6 per ton. Opening at £85 15s. the lowest, market closed strong at £91 7s. 6d. The scarcity of supplies with an increasing demand is reported as the cause of the advance.

In the home market prices have passed all bounds and at the close of September with prices 2 cents per pound higher than one month ago the demand is more insistent than ever and it has become a matter of helping out consumers as far as is possible with only a part of their needs so scarce has the metal become in the last few weeks. The exports for the month to date are around 13,000 tons, the only reason they are not heavier was because the metal could not be delivered. The high price has had no effect on consumption and from the course of the market during September prices are likely to be another 2 cents per pound higher one month hence. The spot market for any kind of copper is entirely nominal—some spot lake can possibly be found at 20½ cents. Electrolytic at possibly 20⅛ cents and good casting at 20⅛ cents. For January delivery lake has sold at 20¼ cents and electrolytic is quoted at that to-day. The market closes very strong with prices likely to be still higher. At the close lake and electrolytic have sold at 21c., and this price is quoted for any delivery this year.

TIN.—London speculators have again taken hold of tin and prices show an advance of nearly £8 per ton. It is predicted by representatives of London houses that tin will sell at £200 in London this year. Trading has been very active and at the close of the month the market abroad is very strong with every indication of higher prices in the near future. In New York prices have been at times below the London parity and that has tended to make consumers and traders hold off from future buying and the consequence is that just as soon as America starts buying the London bulls put up their prices with a rush and we are left to come in at the top. The consumption for the month of September is figured at 3900 tons. This is very heavy and of course gives the London crowd a chance to boost the market. Prices to-day are 2¼ cents higher than a month ago and the general impression in the trade is that London can put prices much higher if they feel like it. We have a visible supply of 4,360 tons, less than half that will arrive during October, so that we shall have to buy possibly 1000 tons in London during the month. We quote the market to-day: Spot tin 5-10 ton lots, 42¼ cents; October-November, 42.10 cents; smaller lots about 15 points higher.

LEAD.—The foreign market has advanced about £1 per ton during the month, making the price there above our parity with the duty added so that there has been no business to report. In the New York market the lead trust have no established price, the last price made was 5.75 and shipments are being billed at this figure. The outside market for spot lead is about 10 points higher at 5.85 to 5.87½.

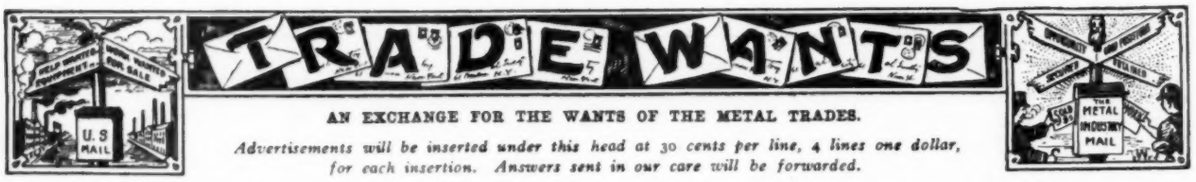
SPELTER.—The London market has been very dull and prices are about 5c. higher for the month. The New York market has been more active and prices were run up about ⅜ cents per pound. The advance did not hold and the market is weak and dull again at 6¼, New York, with a tendency to sag off again to 6 cents. St. Louis is quoted at 6⅛ cents, but consumers can buy at less than this. The spelter market is very easily manipulated and is always more or less erratic.

ALUMINUM.—The price of ingot aluminum has been advanced one cent per pound, being now 40, 38 and 37 cents according to quantity for No. 1 metal guaranteed to be over 99 per cent pure. The manufacturers are still from six to ten months behind on orders.

SILVER.—The fluctuations in the London silver market have been very slight. The tendency has been rather toward a higher basis. The strength in the foreign market during the month has come from the increased demand from India, and at present writing this demand may continue for some time. At the close London is quoted at 31⅞d. and New York 68¾ cents.

SHEET METALS.—Sheet copper prices were advanced September 20 1 cent per pound to 24 cent base. Soldering coppers were raised 1 cent per pound and also brass seamless tubing was put up 1 cent, while copper seamless tubing was advanced 2 cents to 27 cent base. The discounts have been lowered on roll and sheet brass and on brazed brass tubing. Prices have been advanced one cent for Muntz metal and Tobin bronze. October 5 sheet copper has been advanced another cent per pound, making base price 25 cents.

OLD METALS.—The old metal market has been fairly active and prices have taken a substantial advance. Scrap copper has been in active demand and with the present scarcity of copper the market for good heavy scrap can find a ready sale. The home market cannot be reached by importations and the dealers here have the market entirely in their own hands. The demand is good for all old metals and prices are all higher.




**AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.**

*Advertisements will be inserted under this head at 30 cents per line, 4 lines one dollar, for each insertion. Answers sent in our care will be forwarded.*

## FOR SALE

FOR SALE—Eddy Dynamo good as new (latest model). Also speed lathe (new) and 100 polishing wheels. Address WHEELS, care THE METAL INDUSTRY.

FOR SALE—A small jobbing BRASS FOUNDRY doing a good business. Must sell on account of ill health. Address JOBBING FOUNDRY, care THE METAL INDUSTRY.

FOR SALE—A gold, silver and bronze foundry with latest improvements near New York City. Will sell at once. Address BUSINESS, care THE METAL INDUSTRY.

FOR SALE—Two EZRA SAWYER MAGNETIC METAL SEPARATORS, in good condition. Address SAWYER, care THE METAL INDUSTRY.

FOR SALE—PROCESS OF BLACK OXIDATION of Iron and Steel. A method of rapidly oxidizing iron and steel in durable deep black color. For further particulars address HENRI RYCHNER, ZURICH III, SWITZERLAND.

FOR SALE—5 to 10 tons prime remelted SPELTER; also 5,000 pounds TERNE METAL. Quotations upon application. Address P. McLAUGHLIN'S SONS COMPANY, 230-236 North Twelfth street, Brooklyn, N. Y.

FOR SALE—German Silver Scrap, mostly in the form of sheets, viz.:

14,710 lbs. 10 per cent.;
8,000 lbs. 16 per cent.;
6,339 lbs. 18 per cent. Good clean scrap. Address stating price offered, GERMAN SILVER SCRAP, care THE METAL INDUSTRY.

## SITUATIONS OPEN

WANTED—PLATERS and POLISHERS, $3.50 to $4.00 per day. Also fixture hangers and metal workers. ARTHUR R. HASKINS, Inc., 1301 Broadway, Oakland, Cal.

WANTED—BRONZER OR PAINTER accustomed to bronzing or finishing figure work. Good wages for the right party. Address BRONZER, care THE METAL INDUSTRY.

WANTED—Will give good opportunity to party who thoroughly understands smelting and refining business. ADDRESS E, Care THE METAL INDUSTRY.

WANTED—Polishers and buffers; $2.50 for 9 hours per day. THE CREUTZ PLATING COMPANY, Lion Building, Fifth and Elm streets, Cincinnati, Ohio.

WANTED—FOREMAN for a copper and tinsmith department by a manufacturing concern building high grade automobiles. Must be able to make radiators and copper water pipes. Address COPPER, care THE METAL INDUSTRY.

WANTED—Man to take contract in brass finishing plant makign plumbers' supply work, to handle from 12 to 15 hands. Address, stating age and experience, BRASS MANUFACTURER, care THE METAL INDUSTRY.

WANTED—BRASS FOUNDRY FOREMAN for factory in Brooklyn, N. Y. Good opening for man who can take full charge, is a good molder and metal mixer and accustomed to molding machines. Address, stating experience and salary expected, M. B., care THE METAL INDUSTRY.

WANTED—FOREMAN MOLDER for brass foundry. Must be thoroughly up on mixtures and able to handle men and turn out work. Give references and salary expected. Address ALUMINUM, care THE METAL INDUSTRY.

## SITUATIONS OPEN—Continued

WANTED—ELECTRO-PLATER for large shop doing principally cyanide, acid, copper and nickel work. Must be up-to-date and a hustler. State references and salary expected. Address DUPLEX, care THE METAL INDUSTRY.

WANTED—ENERGETIC BUSINESS MAN with capital to finance hardware manufacturing plant near San Francisco, Cal. A1 proposition. Address MR. E. R. S., Richmond P. O., Cal.

WANTED—GOLD AND SILVER PLATER on fine job work. Only sober and reliable experts that can invest a few hundred dollars in a western modern job shop, established 9 years. An excellent chance for a reliable hustler and expert. Enclose references which will be treated confidentially and returned. Address RELIABLE, METAL INDUSTRY.

## SITUATIONS WANTED

SITUATION WANTED—An Assayer of Tin, Terne and similar drosses and knowing the secrets of their smelting would consider opportunity. Salary $115 per month. Address CHEMIST, Tazewell White Lime Works, North Tazewell, Pa.

SITUATION WANTED—PLATER who can furnish best of reference desires position with a reliable firm. Good hustler and can furnish references. Address STEADY PLATER, care THE METAL INDUSTRY.

SITUATION WANTED—PLATER with 14 years' experience who can mix and operate all kinds of solutions. Sober and steady. Married and 36 years old. Address SOLUTIONS, care THE METAL INDUSTRY.

## MISCELLANEOUS WANTS

WANTED—A small plant capable of rolling sheet white metal or German silver from No. 20 to No. 27 gauge, 24 inches wide. Plant to consist of breaking down rolls and polishing rolls. Must be in good condition. Address X. Y. Z., care THE METAL INDUSTRY.

CASH PAID for old precious metals and minerals in any form. Gas mantle dust, bronze powder, bismuth, platinum, mercury, nickel, etc. Address JOSEF RADNAI, 32 Fulton street, New York City.

## CATALOGUE BUREAU

THE METAL INDUSTRY has established a Catalogue Bureau by which it will prepare and do all the work necessary for the making of catalogues, pamphlets, circulars and other printed matters. Estimates will be furnished for writing the description, making engravings, printing, binding, in fact for the entire job from the beginning to the end or any part of it. Let us know your needs and we will tell you just exactly what we can do and what it will cost you. A catalogue should be a trade getter—that is the kind we produce. Write to the CATALOGUE BUREAU of THE METAL INDUSTRY, 61 Beekman street, New York.

## INFORMATION BUREAU

Subscribers intending to purchase metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain the desired information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds. Send for circular.

## OFFICE HEADQUARTERS

When visiting New York, the out-of-town friends of THE METAL INDUSTRY are invited to make our office their headquarters, where a writing desk and telephone service will be at their disposal. Every one interested in the non-ferrous metals and alloys is invited to call

# Metal Prices, October 8, 1906

| METALS. | Price per lb. |
|---|---|
| COPPER, PIG, BAR AND INGOT AND OLD COPPER | |
| Duty Free. Manufactured 2½c. per lb. | |
| Lake, car load lots | 21.00 |
| Electrolytic, car load lots | 21.00 |
| Casting, car load lots | 20.75 |
| TIN—Duty Free. | |
| Straits of Malacca, car load lots | 42.60 |
| LEAD—Duty Pigs, Bars and Old 2⅛c. per lb.; pipe and sheets 2½c. per lb. | |
| Pig Lead, car load lots | 5.80 |
| SPELTER—Duty 1½c. per lb. | |
| Western car load lots | 6.10 |
| ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb. | |
| Small lots | 40.00 |
| 100 lb. lots | 38.00 |
| Ton lots | 37.00 |
| ANTIMONY—Duty ¾c. per lb. | |
| Cooksons, cask lots | 25.50 |
| Hallets, cask lots | 24.50 |
| Other, cask lots | 23.00 |
| NICKEL—Duty 6c. per lb. | |
| Shot, Plaquettes, Ingots, Blocks, according to quantity | .50 to .60 |
| MANGANESE—Duty 20% | .70 |
| MAGNESIUM—Duty Free | $1.50 to $1.60 |
| BISMUTH—Duty Free | 1.50 to 1.60 |
| CADMIUM—Duty Free | 1.50 to 1.60 |
| | Price per oz. |
| GOLD—Duty Free | $20.67 |
| SILVER—Duty Free | .68¾ |
| PLATINUM—Duty Free | 35.00 |
| QUICKSILVER Duty 7c. per lb. Price per flask | 42.00 |

| OLD METALS. | | Price per lb. |
|---|---|---|
| Heavy Cut Copper | 18.00 | 18.50 |
| Copper Wire | 17.50 | 18.00 |
| Light Copper | 16.50 | 17.00 |
| Heavy Mach. Comp | 15.00 | 15.50 |
| Heavy Brass | 12.00 | 13.00 |
| Light Brass | 10.00 | 11.00 |
| No. 1 Yellow Brass Turnings | 11.50 | 12.50 |
| No. 1 Comp Turnings | 13.50 | 14.50 |
| Heavy Lead | 5.40 | 5.50 |
| Zinc Scrap | 4.25 | 4.75 |
| Scrap Aluminum, sheet, pure | 25.00 | 29.00 |
| Scrap Aluminum, cast, alloyed | 20.00 | 25.00 |
| Scrap Aluminum, turnings | 10.00 | 12.00 |
| Old Nickel | 15.00 | 25.00 |
| No. 1 Pewter | 26.00 | 27.00 |

| | Price per lb. |
|---|---|
| SILICON COPPER, according to quantity | .36 to .38 |
| PHOSPHOR COPPER, 5% | .24 to .26 |
| Phosphor Tin | .45 to .46 |
| Brass Ingot, Yellow | .13 to .14 |
| Brass Ingot, Red | .15 to .18 |
| Bronze Ingot | .15 to .17 |
| Manganese Bronze | .20 to .22 |
| Phosphor Bronze | .20 to .23 |

| ZINC—Duty, sheet, 2c. per lb. | Price per lb. |
|---|---|
| 600 lb. casks | 8.25 |
| Open casks | 8.75 |

| PHOSPHORUS—Duty 18c. per lb. | |
|---|---|
| According to quantity | .40 to .60 |

## PRICES OF SHEET COPPER.

| SIZES OF SHEETS. | | 96oz. & over 75 lb. sheet 30x60 and heavier | 64oz. to 96oz. 50 to 75 lb. sheet 30x60 | 32oz. to 64oz. 25 to 50 lb. sheet 30x60 | 24oz. to 32oz. 18¾ to 25 lb. sheet 30x60 | 16oz. to 24oz. 12½ to 18¾ lb. sheet 30x60 | 14oz. and 15oz. 11 to 12½ lb. sheet 30x60 |
|---|---|---|---|---|---|---|---|
| | | CENTS PER POUND. | | | | | |
| Not wider than 30 ins. | Not longer than 72 ins. | 25 | 25 | 25 | 25 | 25 | 26 |
| | Longer than 72 ins. Not longer than 96 ins. | 25 | 25 | 25 | 25 | 25 | 26 |
| | Longer than 96 ins. | 25 | 25 | 25 | 25 | 25 | 27 |
| Wider than 30 ins. but not wider than 36 ins. | Not longer than 72 ins. | 25 | 25 | 25 | 25 | 25 | 27 |
| | Longer than 72 ins. Not longer than 96 ins. | 25 | 25 | 25 | 25 | 25 | 27 |
| | Longer than 96 ins. Not longer than 120 ins. | 25 | 25 | 25 | 25 | 26 | 28 |
| | Longer than 120 ins. | 25 | 25 | 25 | 26 | 27 | |
| Wider than 36 ins. but not wider than 48 ins. | Not longer than 72 ins. | 25 | 25 | 25 | 26 | 27 | 29 |
| | Longer than 72 ins. Not longer than 96 ins. | 25 | 25 | 25 | 26 | 28 | 30 |
| | Longer than 96 ins. Not longer than 120 ins. | 25 | 25 | 25 | 27 | 29 | 33 |
| | Longer than 120 ins. | 25 | 25 | 26 | 28 | 31 | |
| Wider than 48 ins. but not wider than 60 ins. | Not longer than 72 ins. | 25 | 25 | 25 | 26 | 28 | 31 |
| | Longer than 72 ins. Not longer than 96 ins. | 25 | 25 | 25 | 27 | 29 | 34 |
| | Longer than 96 ins. Not longer than 120 ins. | 25 | 25 | 26 | 28 | 31 | |
| | Longer than 120 ins. | 26 | 26 | 27 | 29 | 33 | |
| Wider than 60 ins. but not wider than 72 ins. | Not longer than 96 ins. | 25 | 25 | 26 | 28 | 33 | |
| | Longer than 96 ins. Not longer than 120 ins. | 25 | 25 | 27 | 30 | 35 | |
| | Longer than 120 ins. | 26 | 26 | 28 | 33 | | |
| Wider than 72 ins. but not wider than 108 ins. | Not longer than 96 ins. | 26 | 26 | 28 | 31 | | |
| | Longer than 96 ins. Not longer than 120 ins. | 27 | 27 | 29 | 32 | | |
| | Longer than 120 ins. | 28 | 28 | 30 | 34 | | |
| Wider than 108 ins. | Not longer than 132 ins. | 29 | 29 | 31 | | | |
| | Longer than 132 ins. | 30 | 30 | 33 | | | |

Rolled Round Copper, ⅝ inch diameter or over, 23 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, wider than 17 inches, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

# Metal Prices, October 8, 1906

Net Cash Prices.

## COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot, and heavier, per lb. ..... 28c.
12 oz. and up to 14 oz. to square foot, per lb. ..... 29c.
10 oz. and up to 12 oz. ..... 31c.
Lighter than 10 oz. ..... 34c.
Circle less than 8 in. diam., 2c. per lb. additional.
Circles over 13 in. diam. are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

## PRICE LIST FOR ROLL AND SHEET BRASS.

Prices are for 100 lbs. or more of Sheet Metal in one order.

Brown & Sharpe's Gauge the Standard.

| Common High Brass | in. | in. | in. | in. | in. | in. | in. | in. | in. | in. |
|---|---|---|---|---|---|---|---|---|---|---|
| Wider than and including | 2 12 | 12 14 | 14 16 | 16 18 | 18 20 | 20 22 | 22 24 | 24 26 | 26 28 | 28 30 |
| To No. 20 inclusive.. | .22 | .23 | .25 | .27 | .29 | .31 | .33 | .36 | .39 | .42 |
| Nos. 21, 22, 23 and 24 | .22 | .24 | .26 | .28 | .30 | .32 | .34 | .37 | .40 | .43 |
| Nos. 25 and 26..... | .23 | .24½ | .27 | .29 | .31 | .33 | .35 | .38 | .41 | .44 |
| Nos. 27 and 28..... | .23 | .25 | .28 | .30 | .32 | .34 | .36 | .39 | .42 | .45 |

Add ½ cent per lb. additional for each number thinner than Nos. 28 to 38, inclusive.

Add 7 cents per lb. for sheets cut to particular lengths, not sawed, of proportionate width.

Add for polishing on one side, 40 cents per square foot; on both sides, double this price.

Brazing, Spinning and Spring Brass, 1 cent more than Common High Brass.

Extra Quality Brazing, Spinning and Spring Brass, 2 cents more than Common High Brass.

Low Brass, 4 cents per lb. more than Common High Brass.

Gilding, Rich Gold Medal and Bronze, 7 cents per lb. more than Common High Brass.

Discount from list 15 per cent for orders of over 5,000 lbs. per year. For orders of less than 5,000 lbs. per year, 10 per cent.

## PRICE LIST FOR BRASS AND COPPER WIRE.

| BROWN & SHARPE'S GAUGE THE STANDARD. | Com. High Brass. | Low Brass. | Gilding Bronze and Copper. |
|---|---|---|---|
| All Nos. to No. 10, inc. | $0.23 | $0.27 | $0.28 |
| Above No. 10 to No. 16. | .23½ | .27½ | .28½ |
| Nos. 17 and 18. | .24 | .28 | .32 |
| " 19 and 20. | .25 | .29 | .33 |
| No. 21. | .26 | .30 | .34 |
| " 22. | .27 | .31 | .35 |
| " 23. | .28 | .32 | .36 |
| " 24. | .30 | .34 | .38 |

Discount from list, brass, 10 and 2 per cent; gilding, bronze and copper, 7½ and 2½ per cent for orders of over 5,000 lbs. per year. For orders of less than 5,000 lbs. per year, discount brass, 7½ per cent; gilding, bronze and copper, 7½ per cent.

## PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in. O. D. Nos. 4 to 13 Stubs Gauge, 23c. per lb.
Seamless Copper Tubing, 27c. per lb.

For other sizes see Manufacturers' List.

## PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

| Iron Pipe size. | ⅛ | ¼ | ⅜ | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Price per lb.. | 31 | 30 | 25 | 24 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 24 | 25 | 27 | 29 | 30 |

## BRAZED BRASS TUBING.

Brown & Sharpe's Gauge the Standard.

| | | Per lb. |
|---|---|---|
| Plain Round Tube, ⅜ in. up to 2 in., to No. 19, inc. | | $0.35 |
| " " " ⅜ " " ¾ " " 19, " | | .36 |
| " " " ½ " " ⅞ " " 19, " | | .38 |
| " " " ⅝ " " 1 " " 19, " | | .41 |
| " " " ¾ " " 1⅛ " " 19, " | | .48 |
| " " " ¼ " " 1½ " " 19, " | | .65 |
| " " " ½ " " 2 " " 19, " | | 1.00 |
| " " " ⅛ " " 2½ " " 19, " | | 1.50 |
| Smaller than ⅛ inch. | | Special |
| 3 inch to 3 inch, to No. 19, inclusive. | | .38 |
| 3 inch | | .40 |
| Over 3 inch to 3½ inch. | | .45 |
| Over 3½ inch. | | .50 |

Bronze and copper advance 3 cents. Discount from list 25 and 2 per cent for orders of over 5,000 lbs. per year. For orders of less than 5,000 lbs. per year, discount 22½ and 2 per cent.

## PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

| Wider than and including | *3in. 12in. in coils. | 6in. 14in. | 14in. 16in. | 16in. 18in. | 18in. 20in. | 20in. 24in. | 24in. 30in. | 30in. 36in. | 36in. 40in. | Cutting to Length. | Polishing or Satin Finishing one Side. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| W. 13 and heavier.. | 45 | 45 | 47 | 47 | 47 | 47 | 50 | 50 | 50 | 1 | 2 |
| " 14..... | 45 | 45 | 47 | 47 | 47 | 47 | 50 | 50 | 50 | 1 | 2 |
| " 15..... | 45 | 45 | 47 | 47 | 47 | 47 | 50 | 50 | 50 | 1 | 2 |
| " 16..... | 45 | 45 | 47 | 47 | 47 | 47 | 50 | 50 | 50 | 1 | 2 |
| " 17..... | 45 | 45 | 47 | 47 | 47 | 47 | 50 | 50 | 50 | 1 | 3 |
| " 18..... | 45 | 45 | 47 | 47 | 47 | 47 | 50 | 50 | 53 | 1 | 3 |
| " 19..... | 45 | 45 | 47 | 47 | 47 | 47 | 50 | 51 | 54 | 1 | 4 |
| " 20..... | 45 | 47 | 47 | 47 | 47 | 49 | 52 | 53 | 55 | 1 | 4 |
| " 21..... | 45 | 49 | 49 | 49 | 49 | 51 | 54 | 55 | 61 | 2 | 5 |
| " 22..... | 45 | 49 | 49 | 49 | 51 | 51 | 54 | 58 | 62 | 2 | 5 |
| " 23..... | 45 | 49 | 49 | 49 | 51 | 51 | 54 | 60 | 63 | 2 | 6 |
| " 24..... | 45 | 49 | 51 | 53 | 53 | 53 | 56 | 62 | 65 | 2 | 6 |
| " 25..... | 47 | 50 | 52 | 54 | 54 | 54 | 57 | 64 | 68 | 2 | 7 |
| " 26..... | 47 | 50 | 53 | 57 | 57 | 57 | 62 | 66 | 72 | 2 | 8 |
| " 27..... | 47 | 51 | 55 | 59 | 59 | 60 | 65 | 69 | 75 | 2 | 10 |
| " 28..... | 47 | 51 | 57 | 59 | 60 | 60 | 67 | 73 | 78 | 2 | 11 |
| " 29..... | 49 | 52 | 59 | 61 | 63 | 63 | 72 | 78 | 83 | 2 | 13 |
| " 30..... | 49 | 53 | 61 | 63 | 67 | 73 | 80 | 83 | 88 | 2 | 15 |
| " 31..... | 52 | 56 | 64 | 67 | 72 | 80 | 83 | 86 | 92 | 3 | 17 |
| " 32..... | 54 | 58 | 66 | 70 | 78 | 86 | 93 | 99 | 104 | 3 | 19 |
| " 33..... | 56 | 60 | 69 | 74 | 82 | 93 | 100 | 109 | 119 | 3 | 21 |
| " 34..... | 59 | 64 | 71 | 79 | 87 | 100 | 112 | 119 | 129 | 3 | 25 |
| " 35..... | .. | 74 | 79 | 89 | 99 | 109 | 124 | 134 | .. | .. | .. * |
| " 36..... | .. | 89 | 99 | 109 | 124 | 129 | 144 | .. | .. | .. | .. |
| " 37..... | .. | 107 | 117 | 132 | 147 | 162 | 177 | .. | .. | .. | .. |
| " 38..... | .. | 127 | 142 | 157 | 172 | 187 | 207 | .. | .. | .. | .. |
| " 39..... | .. | 147 | 167 | 187 | 207 | 227 | .. | .. | .. | .. | .. |
| " 40..... | .. | 177 | 207 | 227 | 247 | .. | .. | .. | .. | .. | .. |

*Polished or scratch brushed 2 sides, double above prices.

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

## PRICE LIST OF SEAMLESS ALUMINUM TUBING—STUBS' GAUGE.

| Stubs' G. | ¼" | ⅜" | ½" | ⅝" | ¾" | 1" | 1½" | 2" | 2½" | 2¾" |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 to 11.... | .. | .. | 96 | 86 | 83 | 77 | 67 | 61 | 61 | 61 |
| 12..... | .. | 1.08 | 96 | 86 | 83 | 77 | 67 | 61 | 61 | 61 |
| 13..... | .. | 1.08 | 96 | 86 | 83 | 77 | 67 | 64 | 64 | 64 |
| 14..... | .. | 1.08 | 96 | 86 | 83 | 77 | 67 | 64 | 64 | 64 |
| 15..... | .. | 1.12 | 96 | 89 | 86 | 80 | 70 | 67 | 67 | 67 |
| 16..... | .. | 1.15 | 99 | 93 | 89 | 83 | 70 | 70 | 70 | 70 |
| 17..... | .. | 1.18 | 1.02 | 96 | 93 | 86 | 73 | 73 | 73 | 73 |
| 18..... | 1.85 | 1.24 | 1.05 | 99 | 93 | 86 | 77 | 77 | 77 | 80 |
| 19..... | 1.88 | 1.28 | 1.08 | 1.02 | 99 | 93 | 83 | 80 | 80 | 83 |
| 20..... | 1.95 | 1.31 | 1.15 | 1.08 | 1.05 | 99 | 89 | 86 | 86 | 89 |
| 21..... | 2.01 | 1.37 | 1.21 | 1.15 | 1.12 | 1.05 | 99 | 93 | 93 | 96 |
| 22..... | 2.17 | 1.44 | 1.24 | 1.18 | 1.15 | 1.08 | 1.05 | 99 | 1.05 | 1.08 |
| 23..... | 2.33 | 1.50 | 1.31 | 1.24 | 1.21 | 1.15 | 1.15 | 1.08 | 1.15 | 1.15 |
| 24..... | 2.48 | 1.60 | 1.37 | 1.31 | 1.28 | 1.18 | 1.21 | 1.21 | 1.24 | .. |
| 25..... | 2.65 | 1.69 | 1.47 | 1.37 | 1.34 | 1.28 | 1.34 | .. | .. | .. |

Prices are for lots of 50 lbs. Boxing extra. Smaller, larger and intermediate sizes furnished by manufacturers.

## PRICE LIST FOR ALUMINUM ROD AND WIRE—B. & S. GAUGE.

| Diameter B. & S. G'ge. | 0000 to No. 10. | No. 11. | No. 12. | No. 13. | No. 14. | No. 15. | No. 16. | No. 17. | No. 18. | No. 19. | No. 20. | No. 21. | No. 22. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Price, per lb.... | 43 | 43½ | 43½ | 44 | 44½ | 45 | 45½ | 46 | 47 | 48 | 49 | 52 | 57 |

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

## PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

| Per cent. | Price per lb. | Per cent. | Price per lb. |
|---|---|---|---|
| 12 | $0.52 | 16 | .58 |
| 13 | .53 | 17 | .59 |
| 14 | .54 | 18 | .60 |
| 15 | .56 | | |

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 40 per cent.

Munts or Yellow Metal Sheathing (14" x 48") ..... 20c. lb. net base.
" " " Rectangular Sheets other than Sheathing ..... 22c. " " "
" " " Rod ..... 21c. " " "
Tobin Bronze Rod ..... 23c. " " "
Above are for 100 lbs. or more in one order.